EDITORIAL

Railway Age

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We Hope He's Right

"I believe that in 1924 there will be a restoration of confidence in American railroads. New bridges, new extensions, double-tracking and terminal expansion will follow. . . . The investor in American railroad stocks will recover a considerable part of over $3,000,000,000 which he has lost in the last 15 years . . . Agriculture, transportation and industry can prosper together but not at each other's expense . . . Bears on the stock market and professional tipsters predict that Congress will do something to the railroads. It seems to me on the other hand that Congress will do something for the railroads." These thoughts are those of Wall Street's leading stock market operator expressed at a testimonial dinner given in his honor on November 20. One does not ordinarily give great weight to expressions of opinions by stock market operators, but Mr. Livermore has an enviable reputation in Wall Street and what he says is usually accorded weight commensurate with his standing. For that reason it is significant that he should express so "bullish" an opinion about the railroads. It is equally important that he has a large following, for if enough people agree with him in his views the effect on the market for railway stocks and bonds will be improved accordingly. For some time railroad stocks and bonds have not been popular on the stock exchange, although of late there has been evidenced a much more favorable attitude. If Mr. Livermore is correct further improvement in Wall Street's attitude toward the railroads is to be expected. It follows naturally that railway financing problems will be simplified considerably with resulting benefit to all concerned. Not the least of the troubles of the railroads during the past few years has been the unpopularity of their stocks and bonds with investors. We hope that Mr. Livermore is right in his expectation that this situation is due for a change in the near future.

Valuable Suggestions from Employees

The various contests that have been held at frequent intervals by the Railway Mechanical Engineer and different railway associations have tended to emphasize two pertinent facts worthy of serious consideration. The first is that there are a large number of railway officers who fail to grasp the average employee's viewpoint, and, second, valuable suggestions and criticisms can be obtained from the men actually on the "firing line." That the average minor railway officer is always a step or two in advance of those who work under him in knowledge of the work pertaining to his department, is sometimes a mistaken idea. Such an attitude is a serious impediment in obtaining employee co-operation. Practically every paper submitted in the fuel conservation contest, recently conducted by the International Railway Fuel Association, emphasized the need of co-operation among railroad employees and proper instruction in the handling of fuel. A large proportion of the papers showed careful study and considerable knowledge of both the employee and management side of the fuel problem. The fact that the employee is a student of railway problems is also brought out in papers submitted in numerous other contests. Many papers cite instances of poor operating methods and careless management on the part of railway officers. This is due largely to unfamiliarity with the problems that continually confront the officer. However, the fact that such things are noted and commented upon shows a healthy interest in the work and should be given consideration. Very often an exchange of ideas will bring about an improvement. The railroads are fortunate in having an exceptionally intelligent class of employees to work for them. They cannot afford to ignore their ideas and opinions in matters pertaining to operation and management. From the amount of study and reading done on railway subjects by employees, they should not be so very far behind the officer in knowledge of the work. It is evident that a great many are intensely interested in their work and are ready and willing to co-operate if given half a chance.

Extend Telephone Train Dispatching

An operating officer stated in a recent article that "the installation of a telephone train dispatching circuit is one of the quickest means of increasing the capacity of any line not so equipped." The reason for this is that the telephone reduces materially the time required by the dispatcher to secure information. Ordinarily a dispatcher spends considerably more time in gathering information regarding the location of trains and general conditions affecting their movement than in actually issuing train orders. His conversations with the yard-master's office, the roundhouse, the operators on the line and even the train crews at sidings, can be handled rapidly by telephone, leaving more time for the dispatcher to plan the actual movement of trains. To handle heavy traffic an efficient dispatching force is required. In some cases this makes it advisable for train dispatchers' districts to be split up to prevent delays to trains waiting for orders. Such steps require a change of routine and more men; therefore, means of increasing the efficiency of the present force are more desirable. A telephone train dispatching circuit can be installed in a very short time. However, at this season of the year consideration should be given to the investigation of improvements on divisions on which delays have been acute on account of slow dispatching. Only 52 per cent of the mileage in the United States is dispatched by telephone, therefore telephone train dispatching can be considered logically as one of the first improvements needed on many lines.

The Need for Better Section Foremen

No problem of track maintenance arouses keener interest today than that relating to the recruiting and training of section foremen. The prime difficulty has been generally ascribed to a dearth of good material in the gangs, some going so far as to say that men take jobs in section gangs only because they cannot get other work. This is not the only angle of the problem, for cases are reported where it was found impossible to persuade men in the gangs to take the position of section foreman because the difference in pay was not commensurate with the increase in responsibility. But is the problem entirely one of compensation, or are there other

reasons why the position of section foreman is unattractive to men of the calibre required for the efficient conduct of track maintenance? Many railway officers who have made a close study of railway track maintenance concede that this work is not carried on with the degree of efficiency that attends the conduct of construction work or manufacturing operations. But thus far no one has found the answer. Few railway managements have seen their way clear to authorize general advances in the wages of section foremen because they have not believed that such advances can result in any immediate return proportionate to the increased outlay as an advance in the wages which it might be assumed would attract more capable men could not result in any immediate replacement of poor foremen with better ones. Efforts along somewhat different lines were made by the Baltimore & Ohio and the Pennsylvania through the introduction of bonus systems several years ago, but these plans were abandoned with the advent of government control and proposals to reconsider them have been defeated because of the obstacles set up by the labor provisions of the Transportation Act. The whole problem is one which calls for exhaustive study from all angles. It should cover not only the question of wages but possible changes in gang organization, the advantages of more intensive supervision and the possible use of more and better equipment. With expenses for track maintenance exceeding a half billion dollars annually, the opportunities for effecting economies assume large proportions.

Employee Education in Britain

Mention has been made in these columns before of the extensive arrangements made by the British railways for the education of their employees. Naturally, with the wholesale consolidation of railways which took place in that country the first of this year, it became necessary for the amalgamated companies to modify the educational plans of the constituent companies in order to arrange a general plan for the entire system. The extension of the educational plan of what was formerly the Great Northern to cover the entire London & North Eastern, of which it is now a part, was noticed in the *Railway Age* of August 18. Now the London, Midland & Scottish has announced its plan. Briefly, it provides for the setting up of classes for the instruction of employees at about 65 different points on its system. Classes as a rule will be held from 6 p. m. to 8 p. m., and all the instructors will be chosen from the company's own staff. Instruction will be provided in station practice, railway operation, highway transportation, rolling stock construction and maintenance, steam and electric traction, signaling, operating department organization, shop cost accounting, maintenance of way and statistics. In addition to this instruction provided directly by the company, arrangements have been made with the London County Council to provide courses at Euston Station in London in railway economics, railway and commercial law, railway accounting, railway rates, administration, electrical engineering, economic geography and kindred subjects. Moreover, railway employees may pursue certain approved courses offered by the University of Manchester and the London School of Economics. The company has its own school of signaling and has classes in this subject at 20 points on its lines. Periodic examinations are given to employees taking any of the courses and suitable prizes and certificates are awarded for satisfactory work. Railway educational work in Britain is characterized by a broad variety of courses and the high proportion of the employees who avail themselves of the facilities offered. Whatever may be said of the success of the British railways in giving the kind of service the public desires, certainly no one can doubt that their problems are being widely and thoroughly studied.

Business Stability and Transportation

There is one factor corollary to the efficient manner in which the railways have moved their heavy 1923 traffic that does not seem to have been given as much attention as it deserves. We refer to the effect on general business conditions resulting from the prompt railway service which for the past several months has been available to American industry. The expert students of business conditions have pointed out that the 1923 industrial activity reached its peak in April and has receded since that time. Fortunately, it is their view, the recession has not been great. In 1923 we failed to have a period of inflation. It follows, therefore, that there is no likelihood of a succeeding period of depression. The stabilization of industry has been such that those who are called upon to prognosticate business conditions of the near future hold an optimistic attitude towards the early months of 1924, and, in fact, an optimistic view generally. Various factors have assisted in bringing about the desirable result of stability which has been attained. The idea is not original with the *Railway Age* that one of these factors was efficient railway service. The determination of just how closely business conditions of 1923 parallel those of 1920 is beyond the scope of a publication dealing with railways alone. However, in 1920 transportation conditions were very bad. There was continuing congestion and car shortage, as a result of which industry could not secure delivery of the raw materials and products which it essayed to move by rail. Every industry, therefore, was required to order in excess of its requirements and to build up excessive inventories. In its simplest terms the result was inflation and succeeding that inflation, depression such as existed in 1921. This year business has had current railway service. Ordering in excess of requirements has not taken place nor has there been built up an excessive industrial inventory. We do not mean to presume that the efficient railway service has been the only factor that has assisted in bringing about the stability which has been secured. There is no question, however, that it has been one of the important factors which has worked to this end.

What the Railways Need

THERE IS a significant uniformity between the estimates that have been made by various official and unofficial bodies regarding the capital that should be invested in the railways to enable them to handle future business. The Joint Commission of Agricultural Inquiry of Congress, in the report made by it in 1921, placed the amount at $750,000,000 a year for an indefinite period. Just how it arrives at this conclusion, its report does not show.

The method used by the Committee on Governmental Relations to Railroad Transportation of the Chamber of Commerce of the United States, whose report was summarized in our issue for November 24, page 961, is stated in the report. This committee made a detailed study of actual past experience. At the same time, through the Bureau of Railway Economics, it sent a questionnaire to all the Class I railways. This questionnaire stated conservatively the committee's view as to the probable increase in passenger and freight business within the next ten years. It suggested that railways that believed the increase in their business would be more or less than the estimates stated should make their own estimates, and on the basis of the probable growth of traffic estimate what increases in their physical facilities they would have to make to handle the increased business and how much investment the provision of the additional facilities would require.

The questionnaire was answered by 62 railway companies operating almost 65 per cent of the total mileage of the United States and handling almost 68 per cent of the freight

business. On the basis of the detailed replies made by these railways, the committee made an estimate of the needs of the railways as a whole. This estimate indicated that the railways should within the next 10 years build 5,950 miles of new line and, in addition, 33,400 miles of second and other main track and yard and side track, and should increase their equipment by 725,000 freight cars, 12,300 passenger cars and 13,200 locomotives. Of course, if the equipment in service were to be increased this much, the total amount that would have to be purchased would be a great deal more. For example, the estimate contemplates an average annual increase of freight cars in service of 72,500. Since about 100,000 cars should be retired annually, the average number that would have to be acquired annually would be over 170,000.

On the basis of the figures supplied by the railways, the committee estimated that the new capital invested within the next 10 years should be as follows: For additions, $5,339,874,000; for improvements, $2,533,103,000; total, $7,872,977,000, or an average of $787,297,700 a year.

It will be seen that this estimate of the new investment required annually to enable the railways to handle future business approximates closely to that made by the Joint Commission of Agricultural Inquiry. Both estimates are conservative. The actual investment made from 1905 to 1915 averaged $550,000,000 a year. Wages of labor and prices of equipment and materials are more than twice as high now as then, and probably will average at least twice as high during the next 10 years. That the investment made from 1905 to 1915 was too small was demonstrated by the fact that as soon as traffic increased following the lean years 1914 and 1915 the railways became unable satisfactorily to handle it.

How are the railways to raise all the new capital that will be required? The report of the Committee on Governmental Relations to Railroad Transportation gives the answer to this question. It says: "The immediate aim of railroad regulation should be the restoration and maintenance of public confidence in the railroads as objects of widespread private investment. This confidence can follow only upon a wise policy of railroad legislation and wise administration of regulatory laws by the federal and state commissions."

Will the Roads Meet This Competition?

THE OUTSTANDING DEVELOPMENT in the field of transportation at the present time is the widespread program of highway construction. Hundreds of millions of dollars have been spent this year for the building of hard roads, and an even larger program is contemplated next season. As this program progresses sections of roads are being connected to form through routes between important centers. The completion of these roads is followed almost immediately by the installation of the motor bus and the motor truck, which are making serious inroads in the local passenger and freight traffic of the railways and in many instances are even taking practically all of it. To the extent that this new form of transportation is failing to contribute its full share toward the cost of construction and maintenance of the highways which it uses, this competition is unjust and discriminatory. However, as this service is being installed it is revealing the inadequacy of local railway service in many instances.

As a case in point, a check was made recently of the train service between two important western cities less than 70 miles apart with a combined population of more than 500,000. In spite of the fact that these cities are connected by the main lines of three important railways over which 38 trains are operated daily, there was no train in one direction during five hours of the business day and none in the opposite direction for four hours. In other words, it is evident that the train schedules of these roads had been prepared solely with the thought of through travel and that little or no attempt had been made to develop the local traffic between those cities or to serve that which already existed. As a result, the motor bus is not only taking from the railways much of the local business which they formerly enjoyed, but it is also developing much new business because of the additional transportation service which it is rendering. This is typical of conditions which exist in not a few localities where the railways, by their failure to install frequent local service, are inviting motor bus competition which, when once established, is difficult to overcome. At the present time when the motor bus is in its infancy the railways can afford to give serious consideration to means of competing with it and in those places where it is not yet developed, can forestall competition by rendering a service which will make motor bus service unprofitable.

The Railroads and Train Control

APPROXIMATELY a year and a half has now passed of the two and a half years allowed by the Interstate Commerce Commission for the railroads listed in its train control order of June 13, 1922, to complete installations of train control. The first six months of the period, or from July 1 to December 31, 1922, was specified as the period allowed the railroads to test devices with a view to their adoption later on in the specified districts. But few test installations were made during this period and little construction work has actually been started by the railroads up to the present time. Of the 49 roads listed in the order, only eight roads had definitely selected the device to be installed up to October 1 of this year, while 15 had arranged for or made short installations of a test character and 26 roads had not announced a decision of any kind.

Approximately 5,550 miles of road are included in the train control territory specified by the commission, and 4,193 locomotives are to be equipped. If all of these roads should start active work at the present time it would be practically impossible for them to complete their installations within the time limit fixed in the order. As a consequence, some roads are facing the penalty provision of the law.

This brings up the question whether the railroads can afford to default. There seems to be a feeling in some quarters that it would be cheaper to pay the penalty of $100 a day than to comply with the order, as this amount is less than the estimated interest on the investment. Can any railroad afford to take such a stand? At present, when the railroads are doing everything possible to establish better relations between themselves and the public it would seem that they cannot afford to disregard a government order, for to do so would produce an adverse effect which might be far reaching.

The feeling exists in some quarters that the railroads do not want train control and are attempting to defeat the order. It would appear that the roads are placing themselves in an embarrassing position before the commission, and one from which it will be hard to withdraw gracefully.

The question as to whether train control is or is not a good thing is not pertinent at this time. The big question is whether any railroad can afford to disregard the order of the commission unless, by appeal to the courts, it shall have first got the order set aside as unreasonable and unlawful. If, through their inaction, certain railways antagonize the public and the commission, the loss to the roads in the end may be many times the amount required to comply with the commission's order. The time for action is certainly at hand.

Unprecedented Uniformity of 1923 Freight Traffic

THE RAILWAYS have rendered since early in the present year the most adequate and satisfactory freight service ever rendered in a quarter of a century in a year of record-breaking freight business. Their ability to do this has been very largely owing to the wholly unprecedented uniformity of the volume of business which has been given them by shippers from month to month. The uniformity with which business has been given to them has been largely due to the "ship early" campaign carried on by the railways and many important organizations of shippers last spring and summer.

The results secured by this "ship early" campaign have been so very great and important that they should be emphasized with the utmost possible force.

Among the most marked characteristics of the movement of freight business in this country in previous years were the wide seasonal fluctuations in the volume of traffic. These resulted in a large part of the equipment of the railways being idle in the spring and summer months, and in traffic being poured upon them in a deluge in the late summer and fall months. The usual results in years of large traffic were acute congestions and car shortages in the latter part of the year, delays to shipments of all kinds, large increases of railway operating expenses, general dissatisfaction and denunciations of the railway managements for inefficient operation.

The best measure of the amount of freight service rendered in any given period is the number of tons moved each day over each mile of line. The accompanying table shows the average number of tons moved over each mile of railway line daily in each of the months of 1920 and 1922, and in the first nine months of 1923.

TONS CARRIED ONE MILE PER MILE OF LINE PER DAY

Month	1920	1922	1923
January	4,880	3,743	5,193
February	4,909	4,337	4,977
March	5,261	4,555	5,403
April	4,103	3,536	5,463
May	5,263	3,858	5,460
June	5,487	4,147	5,412
July	5,601	3,741	5,299
August	5,917	4,210	5,553
September	5,872	4,896	5,604
October	5,901	5,425	....
November	5,351	5,434	....
December	4,814	5,006	....

Analysis of the statistics in this table discloses the following facts: In 1920, the maximum daily business, which was handled in August, was 44 per cent greater than the minimum daily business, which was handled in April. In 1922, there was a difference of 28 per cent between the average daily business in March and in April, while the difference between the business handled daily in April and in November was 53 per cent. In the first nine months of 1923 the smallest volume of business, that of February, was 4,977 ton-miles and the largest, that of September, 5,604 ton miles, or only 12½ per cent more. In the six months March to August, inclusive, the widest fluctuation was only 4 per cent.

Contrast the effects that these wide differences in the fluctuations of traffic had upon transportation conditions. In 1920, when the traffic handled by the railways daily was 44 per cent more in August than four months before, there was a net car shortage at the end of August of 145,000 cars, the largest on record up to that time. In October and November, 1922, when the freight business handled was 45 per cent more than three months before, and 53 per cent more than six months before, the net car shortage averaged 153,000 cars for eight consecutive weeks and at the end of October reached the record-breaking figure of 175,523 cars. In the summer and fall of 1923, after an almost uniform distribution of traffic throughout the year, there has been no car shortage at all, although in the first nine months of the year the business handled broke all records.

Uniform distribution throughout the year of the business given the railways increases the amount of traffic they can handle in two ways. First, it is obvious they will handle more business in the early months of the year if they are given 5,500 ton-miles of business daily per mile of line during those months than if they are given only, say, 4,500 ton-miles. Secondly, uniform distribution of the business increases the amount of business they can handle in the months of maximum demand. Suppose, as was the case in 1922, largely owing to the coal strike, they are given for five months only two-thirds as much traffic as experience has shown they can handle. This makes their earnings only two-thirds of what they would earn with a maximum business, and renders it necessary to hold down to the utmost the number of men they employ and their expenditures for maintenance and other purposes. Suppose that then, as actually happened in the fall of 1922, they are called upon within three months to handle an increase of 45 per cent in traffic. It is impossible, as it proved to be in 1922, for them, in such a short time, to so increase and reorganize their forces and improve the condition of their equipment as to enable them to handle the increased business. In such circumstances the maximum amount of traffic they can handle is less than the maximum they could handle if the traffic gradually arose to a peak instead of suddenly increasing by almost one-half.

The capacity of the railways may be considered from two different angles. In view of past experience it is safe to say that they can with existing facilities move an average of 6,000 tons over each mile of line daily when they have opportunity to prepare for it. If they should be given opportunity to do this throughout an entire year, they could handle at least 10 per cent more freight business with existing facilities than they have handled in 1923. In proportion, however, as the uniformity with which business is given them is reduced, the amount of business they can handle in an entire year will be reduced.

The surest and most effective way to reduce the amount of business the railways can handle and increase the investment and operating expense that must be incurred to handle it would be to renew the practice which formerly prevailed of giving them only a relatively small freight business during about two-thirds of each year and then deluging them with business during the other one-third of the year. The best and most economical way to increase their carrying capacity would be to maintain the uniformity with which traffic has been given them during the last year.

Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Development of Waterways and Co-ordination of Rail and Waterway Service. Report of Special Committee V, appointed by the president of the Chamber of Commerce of the United States. 25 p. Published by the Chamber of Commerce of the U. S., Washington, D. C.

Governmental Relations to Railroad Transportation. Report of Special Committee I, appointed by the president of the Chamber of Commerce of the U. S. Summarized in Commercial & Financial Chronicle, Nov. 24, 1923, p. 2289-2290. 41 p. Published by the Chamber of Commerce of the U. S., Washington, D. C.

Railroad Consolidation. Report of Special Committee II, appointed by the president of the Chamber of Commerce of the U. S. 31 p. Published by the Chamber of Commerce of the U. S., Washington, D. C.

Railways For All, by J. F. Gairns. A popular book, de-

scribing the longest roads in various parts of the world, various types of equipment, remarkable engineering feats, and other things that interest people generally. 384 p. Published by Ward Lock & Co., Ltd., London, England.

Readjustment of Relative Freight Rate Schedules. Report of Special Committee III, appointed by the president of the Chamber of Commerce of the U. S. 47 p. Published by the Chamber of Commerce of the U. S., Washington, D. C.

Relation of Highways and Motor Transport to Other Transportation Agencies. Report of Special Committee IV, appointed by the president of the Chamber of Commerce of the U. S. 44 p. Published by the Chamber of Commerce of the U. S., Washington, D. C.

Taxation of Transportation Agencies. Report of Joint Subcommittee appointed by the president of the Chamber of Commerce of the U. S. 8 p. Published by the Chamber of Commerce of the U. S., Washington, D. C.

Periodical Articles

Colorado's Six-mile Tunnel Under the Rockies, by Theodore Merrill Fisher. Progress on the Moffatt Tunnel. Scientific American, December 23, 1923, p. 406.

Geographic Factors in the Development of Trans-Andean Communications, by Preston E. James. Trans-Andean roads built and projected. Maps and illustrations. Pan American Union Bulletin, November, 1923, p. 454-465.

A Legislative Holiday for the Railroads. Should Be Allowed to Show What They Can Do Under Existing Laws. Quotes Mr. Loomis of the Lehigh Valley Railroad. Index [N. Y. Trust Co.] November, 1923, p. 13-14.

New England's Rail Handicap, by Charles R. Gow. Editorial comment, chiefly about the New Haven, p. 710-711. Savings Bank Journal, November, 1923, p. 707-709, 724.

Planned Repetitive Manufacture of Heavy Equipment—Steel Coal Cars, by William B. Ferguson. First Article. Management and Administration, November, 1923, p. 585-592.

The Railways Valuation Muddle. What Has Been Found and How, by Aaron Hardy Ulm. Article I. Barron's, November 26, 1923, p. 5.

The World's Largest Subaqueous Tunnel. Building a $60,000,000 Freight and Passenger Tunnel Beneath the Narrows, New York. With Map showing tunnel's connections with trunk lines in New Jersey. Scientific American December, 1923, p. 412-413.

New Books

Commerce Yearbook for 1922. Compiled under the Direction of the Bureau of Foreign and Domestic Commerce of the Department of Commerce. 5¾-in. by 9¼-in. 692 Pages. Bound in Paper. Sold by the Superintendent of Documents, Government Printing Office, Washington, D. C.

This is a compact, convenient record of the economic activity of the United States in 1922 and the early months of 1923, compiled from reliable sources by Secretary Hoover's admirably efficient department. As is generally known, leaders in the country's business life are greatly interested in finding a solution for the problems presented by alternating periods of boom and depression. This book takes cognizance of the fact that the first step in correction is the ascertainment of changes in price and production and kindred phenomena.

Julius Klein, the director of the Bureau of Foreign and Domestic Commerce, in a letter to Secretary Hoover published as a preface to the book gives the welcome information that the work will appear annually hereafter and in the early spring instead of late in the fall.

The book opens with a general survey of the year from the point of view of business as a whole. This is followed by a detailed summary of developments in the more important industries. The summary of individual industries includes the movements of prices and production throughout the year, employment and other characteristics with a discussion of the factors entering into these movements. The chapter on railway transportation, for instance, gives information on traffic volume by districts, car loadings by commodities, car surpluses and shortages, changes in rates and fares, employment and wages, strikes, priorities and embargoes, operating and financial results, new financing, replacements and improvements, legislation and judicial decisions. Statistical matter is presented in tabular and chart form. Information given concerning other basic industries is similarly complete.

The book closes with a summary of economic activity in important foreign countries in so far as it is likely to be of interest to Americans. No one interested in general business conditions, whether from the selfish point of view of their effect on his own activities or from the broader aspect of national prosperity, should be without ready access to the information which this book contains, and nowhere else can it be obtained so readily and conveniently.

The Principal Factors in Freight Train Operating, by Philip Burtt. 5½-in. by 8½-in. Bound in Cloth. 208 Pages. Illustrated. Published by George Allen & Unwin, Ltd., London.

This is an excellent treatise on British practice written by a railway operating man who has had the additional experience of a lecturer at the London School of Economics. The writer, therefore, knows his subject and, quite as important, has the ability too rarely found among practical men of writing clearly, comprehensively and succinctly. He lays great stress on increased train loading and quotes at length on the progress made on this continent in this direction. Other chapters deal with the types of locomotives and their tractive effort; the "driver's" and the "guard's" reports; car loading; car service; the organization and operation of a "goods" station; the marshalling (i. e., classification) yard; and operating statistics. It is of interest to see the author's interest in our railway practice, although he recognizes that English methods are designed for English conditions as are ours for conditions here. There are no railways in the world which handle freight as efficiently as do those on this continent. The British railways can doubtless, therefore, learn something of value from us. At the same time the American railways cannot afford to be too self-sufficient. In parts of this country conditions are beginning to approximate those in England—dense population, increasing ratio of importance of passenger traffic, growing proportion of highly fabricated goods to total traffic, short hauls and motor truck competition, making necessary more rapid and more frequent railway service. It is not unlikely that the time is approaching when officers of some of our railways could profitably turn to England for guidance in solving their problems. Fortunately Mr. Burtt's book makes a knowledge of the best English practice easily available.

Universal Directory of Railway Officials, 1923. 500 pages. 5½ in. by 8½ in. Bound in cloth. Published by the Directory Publishing Company, Ltd., 33, Tothill street, Westminster, London, S. W. 1, England.

This issue of this well-known annual publication is an improvement over its predecessors in that by the use of thinner paper and smaller type its publishers have reduced the weight of the book by about fifty per cent. Its contents are generally well known. Briefly, they consist of a list of virtually every railway in the world, giving mileage, gage, number of locomotives and cars and the names and addresses of the more important officers. It is a handbook which anyone having to correspond with or visit railway officers throughout the world will find almost indispensable.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

Should Railroad Be Responsible for Commuter's Forgetfulness?

NEW YORK.

TO THE EDITOR:

I could write you reams about the improvements that have taken place in New York Central passenger service in the last five or six years, but like everybody else the spirit to write only moves to action when there is an adverse criticism to make.

The company has established a rule by which a commuter who forgets his commutation ticket can sign his name in the presence of the conductor who collects a cash fare on the cash fare slip, and get a refund of the total amount upon presentation of the cash fare slip and his commutation book. At least, I think this is the rule; there seems to be a little misunderstanding between conductors and ticket sellers. It is obviously a fair rule, and one which has probably made many a commuter experience a warm wave of friendship for the company.

The rule, however, provides that if a man forgets to buy his book the first of the month and pays a cash fare slip and takes this to the ticket window and buys a book for that month, he is not allowed the refund. The thing seems perfectly silly, so much so in fact that many of the conductors will tell you that you can get your money on a refund slip when you purchase the commutation book. Surely the spirit of the order allowing the refund would apply likewise to a refund where a commuter had failed to purchase a book and later purchased one.

WEH.

Funding Depreciation Reserves

SALT LAKE CITY, Utah.

TO THE EDITOR:

Referring to article on Funding Depreciation Reserves appearing on page 755 of *Railway Age* of October 27, 1923:

In considering the investment of a depreciation reserve, I wish to call attention to an important factor which, so far as I know, has been generally overlooked. This factor is the liability of the use of the reserve in maintaining the property; that is to say, whether it will be needed in a short time, at some more distant time, or never.

Assuming estimated life to be correct, a property consisting of one unit will require all of its reserve to replace and maintain the property at the end of its service life.

A composite property, such as a railroad consisting of many independent depreciable units, to be retired on different dates requires only a portion of its reserve built up on the average life theory, to maintain the property as its parts are retired. The remaining part of the reserve built up on the average life theory is an amortization fund representing "decretion," which inevitably occurs to all property without affecting its value for rendering service. (See A. S. C. E. report "Valuation of Public Utilities," page 1722). That portion of the reserve necessary for upkeep, and that portion which represents amortization of "decretion" can be computed separately just as accurately as the total reserve can be computed.

Therefore, in considering a reserve for investment purposes, it should be set up and considered in two parts:

Part One—The fund necessary to meet retirements and renewals of property units at definite dates, as retirements and renewals are estimated to occur.

Part Two—The fund representing amortization of "decretion" which is not required for retirements and renewals in the upkeep of the property.

The first should be invested in liquidable assets according to the proximity of the dates of retirements and renewals. The second may be invested without regard to necessity of liquidation.

MARCUS A. ROBY.

Why Wish for Government Ownership?

ATLANTA, Pa.

TO THE EDITOR:

Your editorial in the issue of November 10 under the caption "Why Should the Employees Favor Government Ownership?" struck home when you said: "They follow the officers of their labor unions without looking up facts or thinking for themselves, and many of the leaders of their labor unions constantly misrepresent facts."

That they follow their union officers in thought is made evident by the fact that employees of the different roads will give the same defense for government ownership by using the same argument to the effect that the government did not have a fair show in the two years it did control them; that during that period the pay-rolls were padded with the names of persons who gave little or no service in return for the pay they drew, and that in every possible way the road owners ran up the expense of maintenance and operation in order to discredit federal operation. No amount of argument could convince them that while the roads were so controlled every new man employed and every other expense incurred, for that matter, was done by the government itself and not by the owners. The latter had no say then.

No, they do not seem to think for themselves.

But why should union leaders want government ownership, and why spread that desire among their members? Do they not draw their salaries regularly and generally maintain their influence over the membership? There seems to be but one answer to this—power, and more power.

We saw in 1918-19 how every labor leader, large and small, took such a great liking to the climate at the national capital. The hotels did a thriving business alone in entertaining these gentlemen. They were then handy to general headquarters for all of the lines where wages and other concessions were administered, and the authorities who administered them were not appointed by or responsible to any board of directors for their actions, but by a political party, and responsible to that party alone. That party was made or unmade by votes.

It will be easily seen that with the backing of a couple of million votes which these union leaders represented, and could promise or deny, much could be done or be prevented from being done.

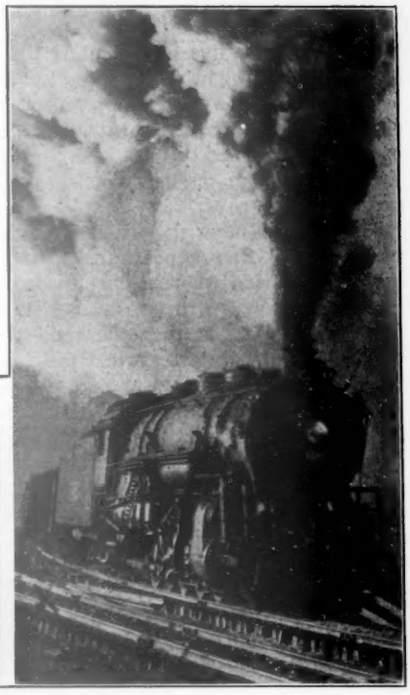
Yes, the reason for wishing a return of the good old days seems plain.

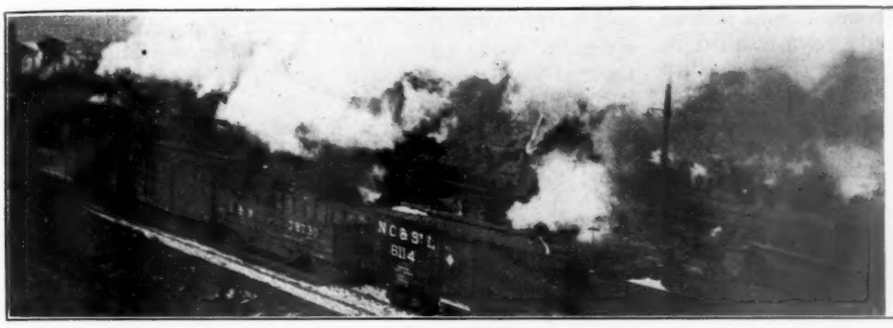
A. C. MYERS,
Clerk, Penna. System.

Fundamentals of Fuel Economy

Paper Showings Wasteful—Systematic Education and Careful Selection of Employees Essential

By W. L. Richards
Locomotive Engineman, Union Pacific, North Platte, Nebr.





[*This paper won the prizes in the International Railway Fuel Association contest for the best paper on fuel economy submitted by an engineman, fireman, conductor, brakeman, or switchman. It deals with the fundamentals of the subject in a constructive and suggestive manner that should recommend it to every railroad officer in America.—Editor.*]

THAT THE PERFORMANCE of any work whatsoever requires an expenditure of energy is an accepted fact; it is also a commonly accepted axiom that heat is the source of all energy, that is, that no work can be accomplished or power furnished without first providing heat. All sources of power or energy may be finally traced to heat.

Railroads are engaged in the business of transportation, i.e., the carrying of articles of commerce and persons from one place to another. To do this requires the provision of the necessary energy; hence the primary business of railroading is the business of furnishing energy to move things of weight.

To furnish this energy requires heat, and fuel is the principal source of this heat.

There are two ways in which the consumption of fuel may be lessened. The first is by lowering the amount of energy necessary to do a given piece of work; the second, by getting a greater amount of energy from the fuel consumed. As both are controlled by those who are in charge, it would seem to be logical to say that three elements enter into the economical use of fuel, namely, operation, mechanical and personnel. It is from these three viewpoints that the subject will be considered.

Operation

In the operation of a railroad from a fuel economy standpoint, we are mainly concerned in the first way of saving, that is, in reducing the amount of work necessary to perform the service required. Under this head comes the reducing of road grades, the elimination of unnecessary car and engine mileage, the making up of trains so as to reduce the tractive effort to haul them, the rating and providing of locomotives with trains which show the least fuel consumption per ton per mile hauled, the doing away with unnecessary terminal and road switching, the careful making up of time-table schedules so that the runs over the district concerned can be made with uniform speed and effort; the prompt handling of freight and passenger traffic so as to minimize delays and the avoidance of every train stop possible.

Perhaps much has been accomplished along the lines mentioned in the preceding paragraph, but there undoubtedly remains a great deal yet to be done before we can say that we have reached satisfactory results. Take the matter of yard or terminal switching; I have in mind a case on a well managed railroad wherein a chief dispatcher had two trains made up at a certain terminal and they were run as made up to the end of that chief dispatcher's jurisdiction, but, at the terminal where another chief dispatcher took charge of the movement, these two trains were ordered remade up in a manner that required 65 switches handling from 9 to 45 cars at each switch. It took two hours and twenty minutes of a full yard crew's time and burned at least two and one-half tons of coal. This is, perhaps, an exceptional case, but there are many, many cases of less magnitude happening on our best railroads every day, nearly all of which could be avoided if the trains were made up in the first instance under instructions that took into consideration the movement of all cars clear through to destination or to the end of that line—instructions which succeeding yard masters and chief dispatchers were bound to respect.

The Evils of "Paper Showings"

There is also another phase of operation which is reflected in the fuel consumption of a railroad and that is what is commonly known as making a "paper showing." It is practised in nearly all departments and seems to be demanded by the system of accounting now in vogue. A train arrives at a terminal with 10 cars of company coal in it, billed to a certain other terminal 300 miles farther on the line; these 10 cars are taken off and 10 other cars of company coal are put on in their place, the second 10 being identically the same grade and kind of coal, loaded in the same line of cars and billed to the same terminal as the first 10. The change is for the purpose of making a paper showing of less delay to the coal in the yard concerned. That is,

10 cars could be held, say five days, and a second 10 could be held another five days, but if the first 10 were held 10 days the showing would be questioned. Because of it fuel was wasted—yes, worse than wasted, because the time of a crew and the wear on the cars and the locomotive went with it—for the railroad did not gain a single item by the change. The sum total of the delay is 100 days for one car in either case.

Instances in other departments might be cited. This "paper showing" often appears in keeping up the tonnage showing of a district, wherein one locomotive is sent out heavily loaded, followed, perhaps, by one running light because the power is needed at the other end of the district and the "light" is not charged against the tonnage per train of the district. Tests show that to have run two small trains instead of the heavy train and the "light" would have resulted in the saving of considerable fuel and in either case the other expense for crews, etc., would have been the same.

The amount of coal issued to locomotives is sometimes overcharged to make up for the shortage in the weight of coal between the mines and point of consumption, in order to keep from showing up this loss. But the practice does not gain us one pound of additional fuel. It would be much better to make a true and exact charge, letting the shortage show and taking steps to correct it if large. By so doing, we save ourselves a loss and also know that the records of actual fuel consumed were accurate.

If we except labor, fuel is the largest single item of expense railroads have to meet. While "Fuel Saving" campaigns have been inaugurated on most of our railroads and have resulted in the saving of some fuel, I am of the opinion that we have hardly scratched the surface compared with what may be accomplished if we go deep enough into the matter. One of the first things to be done, that can be done in the field of operation, is to get entirely away from this habit of making a false showing on paper.

Boards of directors and stockholders may have to be asked to look a little further into the future and give a little more leeway to the management in order to accomplish what appears to be necessary to the real saving of fuel. I refer to the practice of trying to show high net operating revenues at all seasons of the year. On most of our roads the business is seasonal and when the traffic is at the highest point mechanical forces are increased without stint in order to keep every available locomotive at work. But, at best, only the work absolutely necessary to keep the engine in service can be done, as it cannot be held idle long enough to be put in first class mechanical condition. As a result much fuel is wasted; in fact, the matter of fuel economy is generally lost sight of during these periods. Then just as soon as business slacks and gross revenues begin to fall, mechanical forces are reduced in an effort to keep up the percentage of net revenue, with the inevitable result that the roads enter into another rush with the power in as poor condition as before.

At its best, this is a poor policy and is only "robbing Peter to pay Paul." When business began to fall off, had the full mechanical forces been kept at work until every locomotive had been put in the pink of condition, the money spent then would have been more than saved in the next campaign because when engines are idle more work can be accomplished for the same expenditure. Furthermore, many thousands of tons of fuel could be saved for the reason that each machine would enter the rush in an efficient fuel-saving condition and could be maintained in that condition.

The policy outlined would also result in a further saving, as mechanical forces would be kept at a more constant level throughout the year. The filling of the shops with undesirable help during stress periods could be avoided and the cost of labor turn-over thereby reduced. This, of course, is not strictly fuel economy but would be a direct result of it.

As long as fuel economy is held to be a subject that must show immediate results, we shall not get very far in the matter. The cost of fuel is steadily rising and the time is fast approaching when capital expenditures will have to be made looking into the future for returns on the investment. When this is done, I am of the firm belief that the same railroad energy produced now will then be produced with 60 per cent of the fuel now consumed. A hand-to-mouth policy will never accomplish the real object.

Mechanical Factors

Although fuel is used in every department of a railroad, by far the largest percentage is that consumed by its locomotives. A locomotive is a very wasteful machine at its best as far as fuel is concerned. During the government operation of the railroads, a bulletin issued by the Director General gave the amount of heat usefully applied to drawbar pull by the average locomotive as only six per cent of the total amount of heat in the coal consumed. This means that for every 100 lb. of coal burned only 6 lb. is really saved to do the work required. From this fact it is easy to learn that we must devote our attention mainly to our engines if we are to save fuel in a mechanical way.

This bulletin gives the largest amount of heat loss as that passing out of the stack—52 per cent—and it is to overcoming this high percentage that the mechanical department should devote the major portion of its efforts. This means that every attention should be given to valves and cylinders; the cages of the former (the modern piston valve being under consideration) should be bored true and kept in that condition, as should also the cylinder walls, and both should be fitted carefully with rings of the proper size with just the right amount of spring in them to make their movement steam tight. If any of the live steam gets by it increases our percentage going out the stack, and this cannot be permitted if we are to save fuel. The setting of locomotive valves is a moot question and therefore careful experiments should be made by each road to determine the setting that is most economical for its requirements and when once the standard is determined, the valves should be run over as often as may be necessary to maintain it. Lame engines are to be avoided as fuel wasters.

The next great loss is that of unburned gases passing out the stack, this loss being given at 14 per cent. It is to this factor that attention should be given after the exhaust loss has been reduced to a minimum. For every ton of coal burned in a locomotive, from 10 to 14 tons of air are required to be drawn into the firebox to furnish the oxygen necessary for combustion. This air, remaining only a few seconds, must be heated to a high temperature, its various gases combined with other gases liberated from the burning coal and the greatest possible amount of the heat thereby generated transferred to the water to form steam. We must have the required amount of air to make the gases burn with the greatest amount of heat, but given that amount, more causes waste, for we have to heat more than is necessary and it is thrown out the stack again, a total loss. Things which cause more air to be drawn in than necessary and therefore to be avoided are steam and water leaks in the firebox; too straight a passage, causing failure of the air to properly mix with the gases of the coal; too limited a heating surface for the hot gases to come in contact with, and also allowing these metal surfaces to become coated with scale or soot. A leading authority says that a metal surface coated with 1/16 in. of scale or soot will transmit 14 per cent less heat than a clean surface of the same material. These figures will give us an idea of just how important it is that accumulations of this kind be avoided. Brick arches are a great aid in the mixing of gases in the firebox and should be maintained in good order and of proper size wherever possible.

Keeping Power Tuned Up

Economical locomotive practices are so well known that it should be unnecessary to go into full detail in a paper of this kind. The whole secret lies in putting the machine in *good* condition according to the facts we know and then *maintaining it in that condition.* The writer feels we must do this to accomplish real fuel economy and that too little attention has been paid to locomotive upkeep in the past. The order must go out to let nothing interfere with keeping the motive power in prime, efficient condition. This will prove to be a move of utmost economy in the long run, as the following will witness.

On a certain district of a well known road, there was an engineman who knew his business operating what is known as a regular engine. The district foreman in charge of the engine was the engineman's son and, in order to please his father, he paid marked attention to the work that was done on this particular engine. As a result it was probably in a better condition than any other locomotive on that road. Then came an order placing that engine in the pool. Every engineman on the district then ran it in his turn and it received no more than the ordinary attention. But for a period of nearly two years thereafter it was known as the lightest fuel user on the district. As a result of being put in fine condition at the outset, it saved enough coal in the ensuing two years to pay many times over the initial extra cost of being put in that condition.

There is one item that must be touched upon, however, and that is the matter of sand for locomotive use, which perhaps should have been spoken of under Operation. At any rate, it has much to do with fuel economy and should receive more attention. Many a powerful locomotive has been allowed to spin and slip along for hours almost helpless, wasting coal and water—it takes fuel to pump water—for the want of a little sand under the driving wheels. On our heavy power, sand boxes should be enlarged and the best type of sander for the economical and sure use of sand be made a part of the engine equipment.

Sanding engines by hand is also a fuel waste because it takes an additional amount of coal to make up the long delay and, therefore, mechanical sanding devices should be maintained wherever sand has frequently to be taken on.

Policy of Improvement Too Conservative

On the whole, railroads have been just a little too conservative in adopting new and improved devices in engine operation to accomplish a great deal in fuel saving. Locomotives show less improvement for the time since being adopted for general transportation use than any other machine in general use for the same length of time. This has probably been due to two causes; first, the cheapness and plentifulness of fuel, and second, the difficulty inventors have encountered in getting new devices tried out. A more progressive policy should be now adopted and new inventions of promise be tried out carefully with a view to being put in use if practical or to developing them and remedying the faults of the inventor's idea.

I know of a case where a certain type of tank-valve was causing a fuel loss by reason of stopping up easily and interfering with the feed water supply. A new type of valve was given a thorough and exacting test lasting for seven months. It proved its superiority over the old valve in every particular but failed to be adopted on the road concerned because other roads serving the same territory were using the same old type and it was deemed best not to change for that reason.

This is illustrative of the attitude that must be gotten away from. If any improvement is to come, someone must cut a little red tape and do some pioneering.

What has been said under the heads of Operation and Mechanical pertains for the most part to train and engine operation. While these are the principal fuel users, there are other departments where fuel is used, and, consequently, where fuel may be saved by the application of the two principles outlined—the saving of energy by the elimination of needless work and getting the most out of the fuel actually used. A light burned when not needed, a shaft running when not being used and heat turned on when more windows are opened than needed for ventilation are some of the many ways in which needless work is performed; an efficient boiler or steam plant, well maintained and fired by skilled men is one way of getting the most out of the fuel used. All departments should be watched by competent supervisors, all power waste eliminated and methods revised with a view to lessening the work performed wherever and whenever it can be done without loss of efficiency.

Personnel

Although, in looking into the question of fuel economy, consideration has been given first to the matter of operation and then to the mechanical features, it is not intended to convey the impression that they are of more importance than the human factor in this great problem. Given operating conditions that practically approach the ideal, given mechanical attention that is almost perfect, we shall still register a failure in accomplished results unless we have employees who are intelligent and who have attained that degree of skill and interest in their work that will cause them to take full advantage of every opportunity afforded to save fuel. In order that we may have a set of employees who will measure up to the required standard, it would seem that we must approach the subject in two ways, i.e., education and selection.

Education

As many of the men who will have to do with the saving of fuel are old employees already in the service, the method of selection cannot be applied to them and the effort will, necessarily, have to be confined to education. The older employees are naturally conservative, that is, they do not change the habits of a lifetime easily and, therefore, the effort to educate them, to induce them to drop the old, wasteful habits and to take up the newer, more economical ways, will have to be carefully considered lest it do more harm than good. The writer believes the subject should be handled by the use of gentle and constant persuasion rather than by disciplinary measures so far as the older employees are concerned. In the case of the new employee, such as firemen, brakemen, apprentices and all who enter the service where they may go to higher positions, the educational feature should be made compulsory by means of carefully graded progressive examinations relative not only to the particular line of work in which engaged, but also that which pertains to the saving of energy and fuel.

The story of coal, its origin and use, how its elements may be combined with those of the air to produce heat, how the different combinations produce the different gases with their varying degrees of heat when burned, reads like a romance if written in a simple manner, free from technical expressions, so that the ordinary reader may understand. If the problem of combustion could be written up by some authority in story form like Dr. Woods Hutchinson has written the story of many human ills for the Saturday Evening Post I am sure that the tale would be full of lasting interest for all employees, young and old, and would eventually result in the saving of many tons of fuel annually. As one of the means of saving fuel, let us see if we cannot find such a writer and then carry his story to every man having to do with the burning of fuel.

A graduating class at a famous college once adopted as its motto the sentence, "There's more beyond," and it seems

as though this saying is particularly adaptable to fuel saving. There is always more beyond the initial act in all we do on a railroad.

Take a brakeman who has by his alertness discovered a brake not released and sliding the wheel. When he releases the brake he has not only avoided the chance of an accident by reason of a flat wheel but he has caused a saving of fuel in three different ways: he has saved the extra coal that it took to pull the dragging wheel; he has saved the coal it would have taken to furnish the power to turn the lathe that the flat wheel would have been repaired in; he has saved the coal that would have been necessary to produce the steel that would have been cut from the flat wheel to make it round again. Without doubt there are thousands and thousands of instances like the above that are passed thoughtlessly by, but if we can make an educational effort that will bring to the mind of every employee that every act he does has a good or an evil effect on the amount of fuel consumed, we are bound to reap the benefit of that thinking on his part and the result will show favorably in the fuel saved account.

In the matter of compulsory fuel education among the younger employees, particularly enginemen and firemen, they should be required to acquire a technical knowledge of combustion to a degree that will enable them to handle fuel in an economical way at all times and to know the reason for such handling. A large percentage of fuel waste is due to ignorance of the simplest laws of combustion. If we can dispel this ignorance and impart knowledge in its stead, this knowledge will cause action on the part of employees that will be almost automatic and which will go far in the matter of fuel saving. Men do not habitually do the things that they know to be wrong, so if we can educate them as to the right thing, they will, in course of time, almost unconsciously do that which is proper and right, which in this case, would be to handle fuel in a saving manner.

The educational features should be provided by the company and they should be carefully considered in order to make them as entertaining and as interesting as possible. Text books of easy grade, lectures, moving pictures, slides, etc., should be provided, as well as class instruction at regular and stated periods. These means of instruction once provided, there should be no hesitation in requiring those concerned to give full attendance and to keep up the required grades at the periodical examinations.

Selection of Employees

If the railroads are to be retained in the hands of their private owners it will be because of their ability to demonstrate that the roads can be more economically managed and greater service rendered at less cost than if in the hands of the government. Therefore, it becomes more and more apparent that economy of operation is to be our first consideration and that we are not only charged with this responsibility by the stockholders, but by the public as well. If we are to meet this responsibility, the quality of the personnel manning the railroads must be improved. Provision has been made in a preceding paragraph for the improvement of those already in the service by educational means; a further improvement must be made by beginning at the source, that is, by selecting those that are to enter the service.

The writer believes that every railroad should have an employing department, the head of which should be an officer of general authority and who has been carefully, yes, very carefully, selected because of his knowledge and judgment of men. This officer should have assistants—not necessarily persons employed exclusively for this purpose, for many times an officer in other lines would meet the requirements—located in every terminal, whose duty it would be to keep in close touch with the youth in his community and who would talk to and register the names of those likely to make desirable employees. Then when the time came to increase the number of employees during seasonal rushes of business, the new men to enter the service could be taken from the selected lists instead of being grabbed haphazard from those happening to present themselves for employment.

It is my observation that once a person of the less desirable class is allowed to begin work, such person is rarely eliminated and the entire personnel of the road suffers during his or her term of employment. It is imperative that steps be taken to prevent the entrance of this class of labor.

For myself, I believe the time has come when some of the intelligence tests should be used in examining an applicant for service on our railroads. The Binet test and its modified forms, as demonstrated by its use in the Army, undoubtedly gives a very definite line on the native intellect of any individual and, given a high degree of mentality, education will easily develop a highly desirable worker. Lacking in primary intelligence, instruction may develop those qualities which the applicant has, but cannot increase the amount of mentality originally possessed. Intelligence is desirable in all classes of employment but is particularly needed in train service employees because they are often away from direct supervision and in time of stress must have that degree of thinking ability that will enable them to act on their own initiative, doing exactly the right thing and doing it quickly, if they are to be successful for themselves and for the road they represent.

While the idea of raising the standard of the personnel of a railroad is here presented with the thought in mind of saving fuel thereby, it should be apparent to all that the advantage gained will by no means be limited to that alone, but will permeate every line of activity of a transportation system.

Supervision on our roads is being constantly increased; supervising officers come from the rank and file; so it naturally follows that if we have a higher standard of intelligence in the ranks we will have a higher standard of mentality in the supervision. Along with the increases in the number of supervising officers comes a corresponding chance for promotion for each employee and the fact is beginning to be recognized that there are no lines of occupation that afford a greater chance for advancement for the individual than does the occupation of railroading and, granting this fact, it is but another reason why the roads should avail themselves of the chance to secure the cream of the labor market by a selective process at the beginning.

The giving of prizes to those making the best records in fuel saving is not advocated. They are often awarded on a very narrow margin between worthy contestants, so narrow that chance or a slightly favorable advantage often determines the result. They are thereby almost disheartening to those who failed to gain them, but whose effort was equally creditable. Small bonuses that can be earned by a majority of the employees concerned are, perhaps, more fair. But, then, the thought comes that if the conditions of award are such that the major portion can win, the minority, working under the same conditions and drawing equal compensation, should be *required* to earn the bonus. Thus it, too, becomes of doubtful value. If the need of a stimulus is felt, it had best be in the nature of profit-sharing in the savings effected. However, still better than this would be the investment of any amount available for gifts in a manner that would make for a still larger saving of fuel.

Summary

Summarizing, then, the following is offered as a means of securing the utmost in fuel economy:

Operation

Reduce grades where feasible. Generally, this is being done as rapidly as possible for other reasons than that alone of fuel saving.

Eliminate unnecessary car and engine mileage and terminal switching by the appointment of a committee on each railroad, headed by a general operating officer, to study these questions and put in effect all economies possible; the committees of connecting lines to meet to consider wasteful practices regarding deliveries of cars to each other.

Overhaul the system of comparative statements and accounts so as to present no incentive to make movements that consume fuel but do not give any actual earnings. Do away with making certain overcharges to counterbalance shortages. Let the shortage show and make every effort to eliminate it, frankly acknowledging that which cannot be overcome. Make every fuel charge true and exact so that the records will mean something.

Give careful attention to the make-up of train schedules, calling in representative engineers and conductors on the districts under consideration to give advice as to the proper distribution of time, so the run may be made with the least effort.

Overhaul and rebuild locomotives during the slack season. Discontinue the practice of keeping a locomotive in service until a certain number of miles have been made regardless of excessive consumption of fuel due to worn out fireboxes, flues or machinery.

Organize fuel committees—or maintain them where already organized—one for each terminal, composed of local officials and a member from each branch of the service, meetings to be held at stated intervals to receive fuel saving suggestions, act on them and see to the enforcement of those adopted; one or more delegates from each terminal committee together with division officials to form the next higher or division committee to handle fuel matters that are beyond the jurisdiction of the terminal committees, the whole to be headed by a central fuel committee, composed of general officers, this committee to make findings in all cases that have failed of disposition in the lower committees and to have general jurisdiction over all.

Mechanical

Maintain locomotives in prime condition, paying particular attention to cylinders, pistons and cylinder packing; valves, rings and cages, as to fit; keeping the valves square; allowing no leaks either in firebox or front ends; keeping front ends airtight. Use the brick arch in firebox wherever possible.

See that tenders have sufficient coal carrying capacity without being loaded to a point where coal falls off to be wasted. Keep decks in smooth, level condition so the fireman may easily get just the amount of coal wanted on the scoop. Maintain a stop board on the right side of the shoveling sheet to keep coal from spilling out the gangway.

Water valves in injectors should have stems packed tight enough so they will stay where set. Feed water supply under perfect control makes for less fuel consumption and, in this connection, the use of one injector that has sufficient capacity to supply the boiler is more economical than the use of both where this is frequently necessary. In the one case the supply is steady and easy to fire against; the other requiring "slugging" to overcome uneven supply.

Draft appliances and grates should be of such design and adjustment as will best take care of the particular kind of fuel being used; boilers and flues kept free from scale; the latter also to be kept free from soot by frequent cleaning.

Where roundhouse facilities are short, additional house room should be provided as soon as possible. Enormous quantities of coal are uselessly consumed keeping engines alive and from freezing up during cold weather when they must be kept out of doors awaiting orders.

Close touch should be maintained between yard masters, train dispatchers and roundhouse forces to avoid getting engines under steam a long time before they are needed.

Heating and power plants should be of a size that will give the required supply without being forced, skillfully fired and well maintained. The dense black smoke rolling from most of the railroad plants indicates that (a) the plant is being forced, (b) is not being fired properly or (c) is in poor condition; any or all of which should be remedied.

All kinds of steam leaks should be stopped. They are frequently found on passenger trains, locomotives, heating plants—in fact, wherever steam is used.

Lights of all kinds consume fuel. See that none is in use when not needed. Have plenty of ventilation for health's sake but do not try to heat all outdoors during cold weather.

The Education of Personnel

Both old and new employees must be taught the rules of fuel conservation and be required to use them and obey their teachings. Persistent carelessness in the use of fuel should be treated the same as any other infraction of the rules.

The best means of instruction should be provided by the company and pains taken to make it pleasant for the employees required to take it. It should be made available at convenient hours, interfering with their earning time not at all, and with their recreation hours as little as may be consistent with the knowledge they must acquire.

Firemen and the younger engineers and shop apprentices in the machine and boiler departments should be required to have some technical knowledge of the science of combustion. This is equally desirable on the part of the older employees, but making it a rigid requirement would probably cause a degree of hardship that should be avoided. The situation, as to the old employees, will soon work itself out satisfactorily as they will gradually leave the service and, while in the service, they will pick up and use much of the fuel knowledge of the younger men.

The education of the younger and new employees should not be left to chance. Their remaining in the service should be dependent on attaining certain markings as to grade, these markings to be determined by periodical, progressive examinations.

Selection of Employees

Prospective employees should be selected in advance of their employment by means of an employing department. This does not mean that experienced men are not to be taken on as new employees. On the contrary, they are often valuable acquisitions to the service but should be required to pass the same requirements as new men and should furnish satisfactory personal as well as railroad references.

New employees should be taken on probation with the understanding that they are in no sense a permanent part of the organization unless they show an aptitude for the work. It is an injustice to the individual as well as to the railroad to allow him to continue long in the service as a square peg in a round hole. Lack of success as a railroad man does not necessarily denote lack of ability and many a railroad failure has been highly successful in other lines. Consequently, both should be willing to sever connections for the good of each other.

Prizes and bonuses for excellent fuel records are to be discouraged.

The writer has faith in the use of an intelligence test in employing new men.

THE 1923 APPLE CROP of the Wenatchee Valley (Washington) is estimated at 22,000 cars.

C. T. Jaffray Elected President of Soo Line

CLIVE T. JAFFRAY, president of the First National Bank of Minneapolis, Minn., was elected president of the Minneapolis, St. Paul & Sault Ste. Marie, the Duluth, South Shore & Atlantic and the Mineral Range, at a special meeting of the board of directors on Friday, November 23. Mr. Jaffray succeeds George R. Huntington, who died on November 3. He will take over his new office as chief executive of the Soo at once, but will not be in active charge until January 1 when he will relinquish his position as president of the First National Bank. Although Mr. Jaffray has been engaged in the banking business all of his life, he is not without experience in directing the policies of railroads for he has been a director of the Soo for more than a year and prior to that time was a director of the Wisconsin Central for 10 years. He is also a director of the Chicago Great Western.

C. T. Jaffray

In the election of Mr. Jaffray the directors of the Soo line have followed a precedent established when Thomas Lowry, a director of the road, was elected president in 1889, although Edmund Pennington, who was elected to succeed him in 1909, and Mr. Huntington, who was elected in 1922, were operating officers of long experience with the road. The problems of the Soo are primarily those of operation and of traffic rather than of finance since the road is a subsidiary of the Canadian Pacific with its large resources and in such financing as has been done it has benefitted from this connection. As a banker of more than 30 years experience in the Northwest, Mr. Jaffray is intimately acquainted with agricultural and business conditions in the area served by the road. The prominent position which he has held in the business life of Minneapolis and the wide acquaintance which he possesses among the business men of that city and St. Paul, should also be of great value to the property. The Soo is already an economically operated road. Its great need is increased traffic and Mr. Jaffray's election should aid in that direction. His selection for the presidency of this road is also a recognition of the importance of the business interests of Minneapolis and St. Paul since it assures the continued direction of the property by a man familiar with the needs of those important traffic centers. With his intimate knowledge of conditions in this territory, Mr. Jaffray should be able to cement the relationships between the road and its patrons.

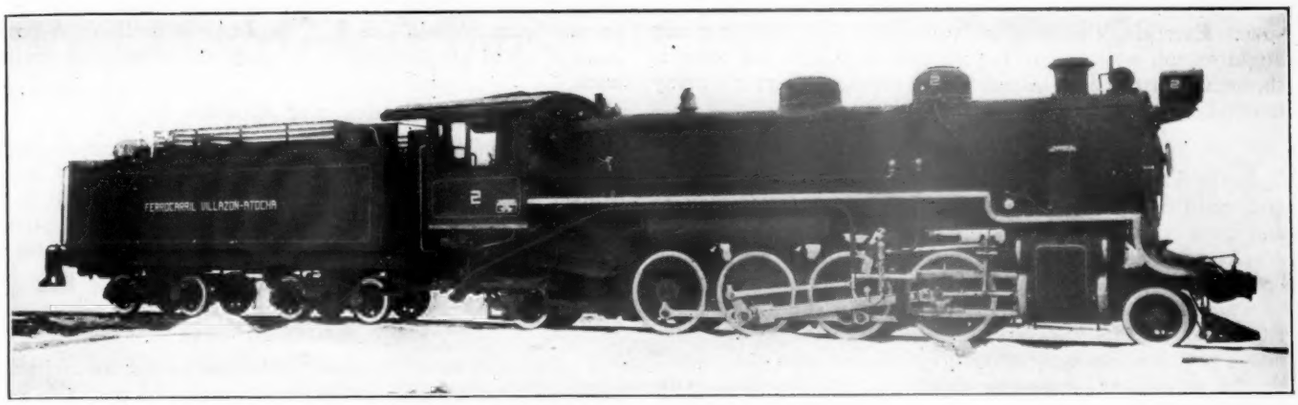
During his 35 years as a banker in Minneapolis, Mr. Jaffray has been identified prominently with the activities in the northwest. He is considered an authority upon conditions in the Ninth Federal Reserve District, having served as a member of the Advisory Council of the Federal Reserve Board for two terms beginning in February, 1919. He was also a member of the Northwest Agricultural Loan Committee of the War Finance Corporation and treasurer of the Minneapolis Chamber of Commerce and is now a director of the Northwestern Mutual Life Insurance Company.

The Soo line, the Duluth, South Shore & Atlantic and the Mineral Range, comprise a system of nearly 5,000 miles of lines. With the exception of the line between Minneapolis and Chicago, which was acquired through purchase of control of the Wisconsin Central, the Soo is distinctly a system of branch lines. The history of the road has been characterized by the construction of new lines to open up undeveloped agricultural territory and as a result the Soo is particularly dependent upon the farming and dairying industries for its traffic.

In spite of the sparseness of its territory and the relatively light density of its traffic, the Soo had long been regarded as a prosperous road prior to the war. Subsequent to federal control, however, in common with the other roads in the northwest, it has suffered severely from the depression in the agricultural communities and the diversion of traffic through the Panama Canal. Only during the last year has the Soo been able to bring its net operating income near the standard rate of return for the federal control period.

Mr. Jaffray was born on July 1, 1865, at Berlin, Ont., and was educated in the high school of that town. He began his career in the banking business at Waterloo, Ont., in 1881. Six years later he moved to Minneapolis and entered the employ of the Northwestern National Bank as a clerk. Subsequent promotions took him to the position of bookkeeper and assistant cashier and in 1895, he was offered the position of cashier with the First National Bank, which he accepted. He was elected vice-president in 1905 and in January, 1917, was elected president, the office he now holds and which he will resign on January 1.

JAMES J. STORROW, chairman of the special railroad committee representing the six New England States, speaking before the annual meeting of the Manufacturers' Association of Connecticut, in New Haven, on November 22, declared that the New York, New Haven & Hartford, which at present "does not give adequate service" to the manufacturers of Connecticut, will need as much as seven or eight millions of dollars annually for improvements, if it is to properly perform its public functions. He asserted that because of its financial condition, the railroad is holding up the industrial development of the State. He spoke deprecatingly of what he termed propaganda, lately started, in an effort to "let the road stagger along a few more years. * * * The stockholders and bondholders may possibly favor this policy, but it is questionable whether the industrial interests of the State should permit their future to be thus gambled with."



Built by the American Locomotive Company for the Atocha-Villazon Line

Work Progressing on Bolivia's New Railway

Atocha-La Quiaca Line, Being Built by Americans, Will Connect with Argentine Railways

WORK ON the 123-mile line which is being built to connect the railways of Bolivia with those of Argentina is progressing well, and it is expected that the project will be completed on schedule time in 1925. Since Bolivia has rail connections with the Pacific and Argentina with the Atlantic, the new line will provide another transcontinental

A Construction Camp

rail route, there being now only one in South America, viz., the Transandine, which connects the railways of Argentina with those of Chile.

Bolivia is connected by rail with Southern Peru and Northern Chile, so the new line will provide these regions as well as Bolivia with a convenient route to the Argentine. Moreover, the new line will make Buenos Aires 450 miles nearer to New York, by way of the Panama Canal and Bolivia as compared with the steamer route in the Atlantic. The distance from Buenos Aires to Antofagasta, Chile, which is the nearest Pacific port reached by rail from Bolivia, will be 1,453 miles. The other Pacific port now connected with Bolivia by rail is Mollendo in Southern Peru. La Paz, the Bolivian capital, will be but three-and-a-half days' journey from Buenos Aires, less than three days from the Argentine port of Santa Fe and but three weeks from Europe. The new line is being built from Atocha, the southern terminus of the Bolivian Railway, to Villazon, just across the boundary from the Argentine town of La Quiaca, which is the northern terminus of the Central North Argentine Railway.

Route

The general direction of the Atocha-Villazon line is slightly east of south. Between Atocha and Tupiza, the principal town and the half-way point on the line, the location follows consecutively the Allita, Chorro and Chalviri water courses. The latter two are precipitous canyons, and this section of the line involves over 40 miles of construction ranging from "heavy" to work of the most difficult nature.

Following the Chalviri and Talina river valleys south from Tupiza, there are some 20 miles of similar, although

Showing the Barren and Difficult Nature of the Country to Be Traversed

considerably lighter, construction, to the village of Nazareno; thence a steady, heavy ascent of 0.4 mile to the "altoplano," and 31 miles of location over this rolling table-land into La Quiaca (mile 122.8). Villazon, on the Bolivian side of the border, is mile 121.5.

The entire line lies between 9,200 and 13,300 feet in alti-

tude. Excepting the attractive valley lands, of comparatively slight extent, adjacent to Tupiza and Nazareno, the route is through a virtual agricultural waste, although there are many mineral deposits in the region.

Progress of Work

In the Villazon-Tupiza section there are 49 miles of dams and artificial works completed; 14 are under construction, and there are 11 on which rail has been laid. In the Tupiza-Atocha section, 21 miles of dams and artificial works have been completed, 6 are under construction, and there are 15 on which rail has been laid. Each section is employing about 1,000 men on this work. The rolling stock at present comprises two Mikado type locomotives of 140 tons each, built by the American Locomotive Company; 15 flat cars, with an additional 20 expected momentarily. The remaining stock will be ordered within a short time.

It is reported that at the end of 1923 the Villazon-Tupiza section will be ready for traffic. The Tupiza-Atocha section will have its rails at the end of 1924, and at the beginning of 1925 it is expected that the Argentine-Bolivia railway systems will be linked together.

The construction on the Bolivia side is being handled by the Ulen Contracting Corporation of New York, under the supervision of Fred T. Hoit, general manager, and J. B. Cameron, construction superintendent and chief engineer.

The Tupiza-Villazon section is under construction by subcontract to Lavenas, Poli & Company, which under a former

Making a Cut

contract, started construction on this part of the road in 1920, but was forced to suspend operations owing to the lack of funds.

The new line has been under consideration by the Bolivian government for many years and the advantages to be derived, both by Bolivia and Argentina, have long been recognized. The difficult nature of the country traversed, however, and the consequent high construction costs have until recently forestalled the adoption of a comprehensive project for construction, although a certain amount of work had been previously performed. The foregoing was the status of the project when on July 8, 1921, the Bolivian government contracted with the Ulen Contracting Corporation of New York for the financing and construction of the entire line. A bond issue of up to $10,000,000 U. S. gold was authorized for the work.

Grades and Curves

The maximum grade is fixed at 3 per cent compensated; the maximum curvature at 11 deg., excepting in the Chorro canyon, where 14 deg. is employed. These standards conform with those already adopted for the partly completed Tupiza-Villazon section of the line, as well as with those of the Bolivian Railway in the division terminating at Atocha.

Track Characteristics

The line will be of one meter (39.37 in.) gage, the Bolivian standard, laid with 60-lb. rails. Quebracho ties, 2,415 to the mile, will be used on track-laying from the south, and Douglas fir, 2,900 ties to the mile on the line from the north,

A Fill Under Construction

322 additional ties per mile being specified for curves of 4 deg. or sharper. Screw spikes are to be used exclusively. Approximately 1.4 cu. yd. of ballast, the best locally available, is required per lineal yard.

The principal opening on the line is located at Mile 65.7, crossing the Rio Talina, where four 65 ft. 6 in. steel girder spans are to be erected. On the work previously executed between Tupiza and Villazon a number of masonry arches in spans up to 65 ft. 6 in. were constructed, but on the work now in progress standard steel girders of 16 ft. 4 in., 32 ft. 8 in. and 65 ft. 6 in. spans are planned for the larger openings. Culverts are designed principally with stone masonry walls and reinforced concrete tops, stone in foundations to be laid in Portland cement mortar and above the ground line in lime mortar, pointed with a cement mix.

Within the first 10 miles out of Atocha, where building stone is very scarce, and it is desired to expedite the track-laying, a number of corrugated pipe culverts are being installed and three creosoted-pile trestles, aggregating 1,214 ft. in length, are under construction. These types of openings have been used in Bolivia previously and the saving in first cost is calculated to more than off-set the depreciation charges. All structures are designed on the basis of Coopers E-40 loading.

May 1, 1925, will not only be the date on which Bolivia will celebrate the centennial of its independence, but it will also signalize the completion of the railway connection with Argentina.

THE CHICAGO, MILWAUKEE & ST. PAUL carried 1,813,880 tons of iron ore from northern Michigan to its docks on Lake Michigan at Escanaba, Mich., during 1923 as compared with 1,535,000 tons in 1922.

The Importance of Personal Records

Analyzing Essentials of Individual Personal Records—Requirements of Record Systems

By J. C. Clark

PROBABLY the most complex problem in human experience is correctly to estimate the character and ability of our fellow men. The manager of any large enterprise is faced with this problem; but for the railroad manager the problem has peculiar importance because of the public character of the service performed and the hazards to life and property incident to railroad operation. The physical examination will determine very accurately a man's physical qualifications for any given position, but there is no way to bore into a man's head and see what is there, and it is the head that controls the actions of the man. It is an old saying that actions speak louder than words, and it is by actions or performance that we have to judge the man.

God created man with the power of logical thought or reason, and in this way gave him dominion over the earth. It would seem that man would use his power of reason to control his actions in all cases, but as a matter of fact, every individual's life is one long struggle between logic or reason on the one hand, and passion, impulse, and suggestion on the other hand. Passion is used in its broadest sense and includes love, hate, prejudice, excitement and similar characteristics. It is possessed in some degree by every normal human being and is deep-seated. It is not possible or desirable that men should control all of their passions. The love between man and wife, and between parent and child is the strongest force in human existence, and is what makes life worth living. A happy home makes a loyal and contented employee in the great majority of cases.

A great many actions are the result of impulse. Some natures are more impulsive than others, but some percentage of the actions of every human being is the result of impulse. This is another characteristic that is deep-seated and may be the result of heredity, environment, or simply habit. How many times during investigations have railroad men said, "I don't know why I did it, I didn't think." In a great majority of these cases, action of some kind was necessary, but the man acted on impulse without using his head.

The power of suggestion also controls a certain percentage of the actions of every man. Suggestion may come in various forms, but as a rule it comes from fellow employees. How often has the engineman run on short time against a superior train when he knew the time was insufficient, simply because some other member of the train crew suggested that he try it? If each man would review his past life and analyze the various things that have had an important bearing on his life, he will find that a considerable portion of his acts have been the result of suggestion.

Analyzing the Employee's Actions

Summing up the previous paragraphs, it may be said that the acts of every man come under two heads; controlled acts or those that are the result of logical thought, and uncontrolled acts which are the result of passion, impulse or suggestion. If controlled actions prove to be wrong, it is because the man's training has been wrong or incomplete. If uncontrolled actions are wrong, as they usually are, it is because of natural characteristics that are very difficult to change. When too large a percentage of an employee's acts continue to be uncontrolled, he is an unsafe man to retain in railroad service. It is manifestly impossible to make a definite line of division between controlled and uncontrolled actions, but it is reasonable to suppose—and we know from experience—that controlled actions are more likely to be the result of training received in railroad service, while uncontrolled actions are more likely to be the result of heredity, or training during childhood and early manhood, environment or disposition.

In the early days of industry, when organizations were small, the manager had an opportunity to observe practically every responsible employee's actions often enough to form an opinion of his character and ability. He also had an opportunity to know at least something of the early training, environment and home life of most of his employees, and he was guided largely by personal knowledge in building up his organization. A modern railroad manager, however, does not have this opportunity, but must depend to a large extent upon the personal record.

In the absence of intimate personal contact between manager and man, the personal record should be made as human as possible. It should be a bird's-eye view of the employee's working life, and to be of value must take into consideration any factors in his social life that affect his service. In other words, instead of recording the bald facts concerning a man's service, the supervising officer who is in direct personal contact with the employee must be trained to analyze the actions of each employee involved in the light of the facts he is able to obtain and express an opinion accordingly. The system of rating men, described in an article in the *Railway Age* of March 18, 1921, provides a way for the supervising officer to do this, but the personal record system must be devised with this end in view.

References

Most railroads require the applicant for employment to state his date of birth, nationality, whether married or single, residence, number of dependents, and other similar facts concerning himself, which are very necessary. They also require a statement of previous employment for a period of years. In case the applicant has had previous railroad experience, a form letter is usually addressed to his former employers requesting information as to his previous service. The answers usually comes back "Service satisfactory" or "Discharged for responsibility of accident," or similar stereotyped statements that really give little indication of the applicant's character and ability. If the system of rating referred to in the previous paragraph was in general use, a percentage rating could be given that would really indicate the applicant's standing with his former employers. An employee of very high standing might be properly discharged for responsibility of accidents, and such an employee often maintains a very high standing after being reinstated to his former position or employed by another company. On the other hand, an employee may be discharged for responsibility of an accident which showed him to be a very undesirable employee. This type is seldom reinstated unless under great pressure from a grievance committee, and if employed by another company usually continues his unsatisfactory service.

In case the applicant has not had previous railroad experience, he is required to make a statement of any previous employment and to give the names of responsible parties who can be referred to for a statement as to his habits, char-

acter, and actions. The replies received from such persons are usually of very little value, partly because it is right and human nature to emphasize the good points the applicant may have, and partly because the persons referred to as a rule have little or no conception of the qualifications necessary in the job for which application is made. It would pay any large railroad to have men on the staff of the Employment Bureau to make personal investigation of applicants for positions in train and engine service and some other of the responsible positions. The report made by these investigators should be made a part of the personal record, in case the applicant is taken into the service. In recruiting inexperienced men, it is a wise policy to select from the territory served by the railroad, because investigators can be made more readily and more complete information obtained.

Statistical Requirements

Before going into the details of the employee's service record, it is well to discuss briefly the requirements of a personal record system. In addition to making provision for the details of the employee's service, it is necessary that the records be kept in such form that statistical information can be quickly and cheaply obtained. Comprehensive labor turnover reports would give the best information to the executive as to the state of his organization. (See *Railway Age* of December 31, 1920.) It is often important to know the number of employees of a certain nationality or the percentage of women or the percentage of married or unmarried men. In order to have this information readily available for statistical purposes, such employee should have a personal record card, which would also serve as an index for his personal file.

There are at least two systems of visible card records on the market that can be readily adapted to this purpose. These systems provide a stiff paper folder for each card, and the holders are arranged in panels or cabinets with approximately 100 holders to the panel and so arranged that that there is one-quarter inch margin of each card visible. On this margin is typed the employee's name, date born, file number, occupation, and seniority date. If the employee has been granted a leave of absence, the date of the expiration of the leave of absence is also shown in the visible margin, on a removable signal. In case the system of individual progress reports is being used, the date the next progress report is due can be shown on a removable signal. By the use of colored signals, the sex, nationality, citizenship, whether married or single, whether subject to watch inspection rules, and length of time in the service, can also be shown on the visible margin. With this system of card records installed, all of this information can be abstracted for statistical purposes with great rapidity, as all the information enumerated is visible and is shown in the same position on every card.

In working up the form of card to be used, great care must be taken to show only the information that is of value and required often enough to justify keeping up the record. With this system, it takes very little time to keep a complete record, but where there are thousands of employees, every additional item of information requires some time, and it would be very easy to burden the record with information that is no doubt useful but not of sufficient importance to justify maintaining it.

Personal Record Files and Cards

The employee's personal record file should start with his application for employment, and should contain all documents having direct bearing on his service. The files should be numbered consecutively and filed in numerical order. The personal record cards should show the employee's name, file number, employing officer, and any other information that is called for frequently. This is shown in the body of the card and not on the visible margin as described above. The body of the card should provide space to show the date, location and position when first employed, or when re-employed. The same space can be arranged to show on it transfers, promotions or reinstatements. The body of the card also should contain space for the date, location, cause and nature of any personal injuries. It could also be arranged to show the amount of time lost and the compensation paid on account of injury.

For employees coming under the watch inspection rules, a paster is inserted upon which the record of watch comparisons and inspections and also a description of the watch is placed. For employees coming under the Brown system, or other systems of discipline, a paster is inserted upon which record of discipline is kept. It is practical to insert a maximum of 10 pasters so that if it is deemed advisable to keep other records this can be done.

The government requires every employer to make a report of the compensation paid an employee every year, for income tax purposes. The work of compiling these reports is generally being done in the auditing department, but there seems no vital reason why arrangements could not be made to have the compensation record kept in connection with the employee's personal record card. If this arrangement were made, it could be done very much cheaper and would save a vast amount of confusion due to the same employee transferring from one department or division to another and appearing on different payrolls. It would also avoid confusing names that were similar or identical. In addition to these advantages, it would be a great help in keeping a check on new employees, transfers and promotions, and would insure the accuracy of the employee's personal record, as well as insuring that it would always be kept right up to date. The visible card system referred to above makes provision for a compensation card to be placed in the reverse side of the holder. This card is arranged to show compensation for four years, including any compensation that may be paid by mutual benefit department or company insurance.

Space will not permit going into further details, but it should be emphasized that a well-planned system of personal records, properly kept, has almost unlimited value in a large organization. Personal records can and should be used to advance the best men in the organization for promotion and to weed out the inefficient, unfit and undesirable. They should also be used to keep a complete check on signal tests, watch comparisons, transfers, personal injuries, company insurance, compensation and other items too numerous to mention. To a personnel department whose object is to build a better organization they are indispensable.

Keystone

Icing Cantaloupe Cars, Imperial Valley, California

Princeton Station and Upper Yard

Handling the Football Traffic at Princeton

42 Special Trains Handled in Short Period Over Branch Line of Normally Light Traffic

By John Barriger
Transportation Apprentice, Pennsylvania System

THE FINEST EXAMPLE of team work at the Harvard-Princeton football game played at Princeton, N. J., on November 10, was not displayed by either of the contestants but by the Pennsylvania Railroad. This directly involved over 350 men detailed to the special trains and the operation of the Princeton branch.

About two-fifths of the seating capacity of Palmer Stadium represented the passenger carrying facilities demanded of the railroad which accomplished with a brief space of time the movement of 22,907 persons over a section of the busiest passenger carrying division in the United States and concentrated at an objective situated at the end of a branch line of normally light traffic.

The Princeton branch leaves the main line of the New York Division at Princeton Junction, almost the exact mid-point between New York and Philadelphia, and extends to the Princeton campus, 2.7 miles northwest. To accommodate the transportation of large crowds attending events at the University, the Pennsylvania Railroad has three passenger yards at Princeton with 30 tracks of passenger train length. These are paired and spaced to provide open platforms for receiving and discharging passengers. All but three of the tracks are double-end-connected to minimize the necessity of shifting trains to release locomotives.

Temporary Double-Track Operation

The Princeton branch is a two-track railroad normally operated as a single track line with a siding throughout the entire length. One train and two crews are sufficient for the operation of the twenty passenger trains scheduled in each direction daily to connect with the main line trains stopping at the Junction. To meet the demands of a special movement, a general order placed the siding in main track service and created a double-track railroad within specified time limits during which many regular trains on the branch were annulled. Seven block stations were opened and trains operated in both directions by signal indications.

On Saturday, November 10, within an interval of three hours, 28 special trains were dispatched from Pennsylvania Station, New York, six from the Jersey City Terminal, six from Philadelphia, one from Washington and one from Trenton, a grand total of 42 trains with 298 cars. The return movement commenced at 4:40 p. m. and all but two trains (held for those staying late) had been dispatched within two hours.

Crossovers Installed

CD tower, Princeton Junction, allows for complete flexibility in cross-over movements on main line tracks and in handling trains between New York and Princeton, but does not permit trains from Philadelphia to the branch without making a switch-back movement. Normal requirements do not warrant the expense of extending the interlocking layout to overcome this condition and non-interlocked facing-point cross-overs are out of the question. However, to accommodate the urgent demands of football travel the latter consideration was set aside for the day and cross-overs were installed leading from the eastward freight track to the westward freight track and thence to the westward passenger track and the Princeton branch. These hand-thrown cross-overs were safeguarded by facing-point locks and switch circuit controllers and an interlocked home signal was erected to direct movement from the eastward freight track, used by the special trains, to the Princeton branch.

During the time limits of the general order, the Princeton branch was taken out of New York Division dispatching dis-

trict C and placed under a dispatcher stationed at CD tower. At the beginning of the inward movement a form "31" hold order stopping eastward trains (i. e., towards the Junction) was addressed to all block operators on the branch. The eastward main line freight track was used by all trains from points west of CD and these were given train orders at MO tower, east of Trenton, to run against the current of traffic on the branch. Trains from New York using the westward track over the branch moved without orders with the current of traffic.

One or more block operators and an adequate force of signalman, operators and switchmen were stationed at each block office along the branch. A large force of car inspectors, linemen, trackmen, railroad patrolmen and car cleaners were on duty at Princeton. The last named group was kept busily

PENNSYLVANIA RAILROAD SYSTEM—EASTERN REGION
New Jersey Division
New York Division

Jersey City, N. J., November 1, 1923.

GENERAL ORDER No. 204

Between the Hours of 8.08 A. M. and 9.00 P. M., Saturday, November 10th, 1923.

PRINCETON BRANCH:- Between Princeton Station and "MF" block Station will be operated as a double track railroad.

Between "MF" Block Station and Semaphore Signals "A" and "B" will be operated as a single track railroad.

Between Princeton Station and Princeton Junction, including East and West legs of "Y", Block Signal Rules No. 301 to No. 375, inclusive, will be effective, except Rules No. 317-A and 318-A.

Between "BG" and "MF" westward trains on Eastward Main Track and eastward trains on Westward Main Track UNDER TRAIN ORDERS will be governed by Block Signals.

Eastward Block Signals for Westward Main Track and Westward Block Signals for Eastward Main Track at "CH", "P", "HD", and "AY", and Westward Home Block Signal at "MF", east leg of "Y", will be located on left side of track on which train is governed.

Between Princeton Station and a point 3400 feet east will be within Yard Limits.

Princeton Junction, Princeton Branch Tracks, including East and West Legs of "Y", to a point 2600 feet west, will be within Yard Limits.

Block Signals, Draw Signals and Semaphore Switch Signals are located as shown on diagram.

Two-arm home signal located on overhead bridge, 1400 feet west of "QN" No. 2 track (Princeton Junction), will be in service.

Attention is called to the SEMAPHORE SWITCH SIGNALS AND DRAW SIGNALS which indicate position of switches and draw and do not indicate that track is clear.

Signal "E" at "MF" will display distant indication for signal "A". Telephones in boxes marked "T" are located as shown on diagram.

PRINCETON:- Lower Passenger Yard, north of Branch Tracks 1500 feet west of Canal; Middle Passenger Yard, north of Branch Tracks 2150 feet west of Canal; Upper Passenger Yard, north of Branch Tracks 2450 feet west of Canal, and "Y", connected with Upper Passenger Yard, in service.

SEE DIAGRAM:

PRINCETON BRANCH:- Trains Nos. 3833, 3835, 3837, 3839, 3841, 3843, 3845, 3847, 3849, 3851, 3832, 3834, 3836, 3838, 3840, 3842, 3844, 3846, 3848, 3850 annulled on this date.

PRINCETON JUNCTION:- Trains Eastward Nos. 218, 806, 224, 228, 814, 234, 3876, 816, 240. Trains Westward Nos. 219, 225, 811, 229, 233, 3875, 1077, 245, 815, 3877, 129, 817, 3879 must not stop at Princeton Junction Station on this date to receive or discharge passengers.

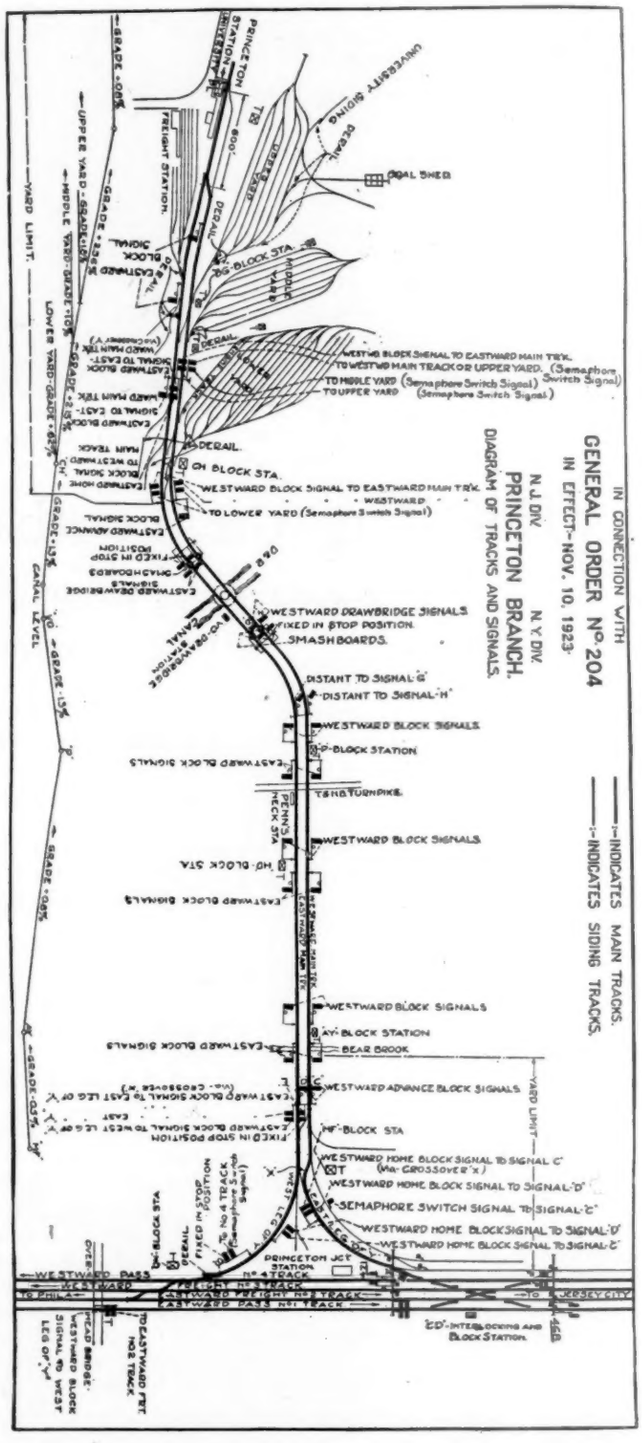
Copy of this General Order and Diagram must be pasted in New York Division Terminal Time Table No. 9.

L. K. MARR. Asst. Superintendent. **F. D. DAVIS.** Superintendent.

engaged gathering up and disposing of trash scattered in the coaches, but fortunately there was little or no need for the other forces held in readiness for immediate call in any emergency.

Relief Locomotives in Readiness

The profile of the branch, which extends across a rolling country, coincides with the ground line and therefore the grades are heavy, a marked contrast to the almost level main lines. The approach to Princeton is particularly steep (maximum grade 2½ per cent) and in the handling of trains was necessarily operated as a momentum grade. During the height of the inward rush the specials followed each other on both tracks on very short headway, and the slightest delay in receiving any train would stop others on an ascending gradient too steep for making an unassisted start. As a precautionary measure, tangent portions of yard leads were kept sanded and the curves oiled by trackmen assigned to this sole duty; and, in preparation for any possibility, three locomotives were stationed at Princeton and two were held at Princeton Junction ready to proceed immediately to the assistance of any stalled train. Only one train required such aid, which was given so promptly that a delay of but five minutes resulted.



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Along the main line relief locomotives and wrecking cranes and the maintenance of way department's work trains were placed at strategic points available for immediate serv-

ice in case of engine failure on a football special or a freight accident which might block the tracks. None of these auxiliaries were used.

The storage capacity of the passenger yards plus that of the freight yard not being equal to the requirements, the first trains received were moved off the branch as soon as the passengers had been discharged; the hold order against eastward movements was annulled to permit this, and then replaced. The overflow was held at Monmouth Junction, 7.5 miles east, and at the close of the game these trains were moved down the westward passenger track towards CD and held awaiting movement to Princeton as needed.

During the lull while the game was in progress, locomotives were turned on the wyes at Princeton and Princeton Junction and supplied with water, and everything was put in readiness for the high water mark of the day which would be reached when the end of the contest loosed the flood from Palmer Stadium.

Night was fast approaching as the crowds swept towards the trains. Elaborate series of directing posters prevented confusion and kept the people moving in steady and unbroken streams. Few metropolitan terminals could display such a picture of high pressure railroading as was to be seen in that little college town. Thirty-two trains with headlights and white classification signals aglow were hissing and steaming beneath the arches of electric lights erected over the improvised terminal. Trains followed one another on each track at five minute intervals.

Freight movement was carefully supervised so that no trains other than those for stock and perishable traffic were moving with the direction of the special trains during their period of operation. Thus in the morning the eastward freight track was restricted in freight service between Philadelphia and CD and the westward freight track east of the last named point. These directions were reversed in the late afternoon.

Moving the specials from the branch to the main line at CD during the peak of the Saturday afternoon traffic load without delaying any train was the crowning transportation achievement of the day. This was effected through the perfect co-ordination between those supervising movements from CD and directing them at Princeton and the promptness with which car doors were closed and the train started upon receiving the verbal or signalled instructions to do so.

The busy scenes enacted at Princeton were almost duplicated at the Philadelphia and New York stations and passenger yards and the wave of activity extended to the other divisions which assisted in the marshalling of cars necessitated by the special travel.

To familiarize each employee thoroughly with his particular duties, the various services involved were on separate days taken on a tour of instruction over the branch on which divisional staff officers explained the plan of operation and physical characteristics of the line and yards. This was done notwithstanding the fact that nearly all had had past experience in handling football crowds at Princeton and elaborate printed directions had been issued to all.

The excellence of the day's performance is made evident by the table which follows:

AVERAGE TIME OF ALL TRAINS (INC. EXP. AND LOCAL)

	Going	Returning
N. Y. and Prin. 51 miles	1 hr. 38 min.	1 hr. 32 min.
Phil. & Prin., 46 miles	1 hr. 15 min.	1 hr. 12 min.
FASTEST SCHEDULE BETWEEN		
N. Y. & Prin. Jct.		1 hr. 4 min.
Philadelphia & Prin. Jct.		55 min.
Prin. & Prin. Jct.		10 min.

EDWARD TIBBITS, 97 years old, who died at Port Jervis, N. Y., on November 23, is said to have been the first fireman to fire a locomotive with coal on the Erie Railroad. He was in the service of the road for many years.

The Neosho Plan—a Builder of Railroad Business

By N. C. Tompkins
Adv. Mgr., The Creamery Package Mfg. Company

MANY OF THE CONTEMPORARIES of James J. Hill considered him crazy to build a railroad through the deserted northwest, and more of them considered it foolish for him to try to build up his railroad by financing settlers to locate along the right-of-way. It seemed too much like lifting one's self by one's bootstraps. But time has vindicated Hill and his vision. Millions of men, women and children are now living in prosperity and affluence because Hill dared to dream, and thousands of investors are deriving a good income from the dividend his road regularly declares.

Doubtless hundreds—yes, thousands—of railroad men have yearned for an opportunity to open up and conquer a new railroad empire, and then have turned with a sigh to their humdrum tasks, convinced that the opportunity for creating a new railroad kingdom was gone, in this country at least, forever. Can it be possible that these men are mistaken? That a great territory still awaits the magic wands of men of vision, and that territory lies at the very feet of almost every railroad man—so close, in fact, that he overlooks it while straining his eyes to catch a glimpse of the rainbow beyond?

The experience of the Erie, the Central of Georgia, the Seaboard Air Line, the Lackawanna, the New York Central, the Atlanta, Birmingham & Atlantic, the Baltimore & Ohio, the Chesapeake & Ohio, the Northern Pacific, the Kansas City Southern and the Soo Line with the so-called "Neosho plan" would indicate that almost every railroad has a great territory lying dormant along its right-of-way, which, by the application of the Golden Rule, can be awakened from its long sleep and started on the road to prosperity, incidentally giving great impetus to the growth of the freight business of the road.

And just what is the Neosho plan or Golden Rule sales plan?

A group of retail merchants in Neosho, Mo., which is located a few miles from Joplin, Mo., in 1914 organized an advertising club and conceived the idea of a co-operative advertising campaign. It was decided to have a Sales Day once a month. Double-page space was taken in the local newspaper, which was mailed out to every tax-payer in the county. A committee of the club censored all advertisements and refused its approval of any offering that was not a genuine bargain.

Although the results for the different merchants varied according to the kind of business, it brought an average increase of 53 per cent for the Sales Day over the business for the merchant on the corresponding day of the year before. And this business was velvet—it was not at the expense of some other day of the week. This new business, of course, created increased freight tonnage to replace the extra quantity of goods sold. In addition many farmers transferred their shipments from some other town to Neosho. The trade territory was extended from a radius of a few miles around Neosho to a radius of 30 or 40 miles.

The club has added other features to its activities since its establishment. It now holds a monthly auction of live stock, household goods and farm implements; it holds its club meetings at some farm in the country; it uses advertisements in newspapers in nearby towns, and it requires that all advertising schemes be submitted to a committee and receive its approval before they will be accepted by any of the club members.

The foregoing is the plan with some slight variations which has been adopted by a large number of towns, and has

demonstrated its success in any town having a population of from 1,500 to 15,000. The apostle of the new plan, Gurney R. Lowe, who hails from Neosho, and who was one of the originators of the Neosho plan, is now engaged in establishing similar new clubs and devotes his entire time to this work.

The plan not only has the whole-hearted endorsement of the railroads previously mentioned but is also endorsed by the Associated Advertising Clubs of the World, Cornell University, the Pennsylvania State Chamber of Commerce, University of Florida, Indiana State Chamber of Commerce and many other similar organizations.

The direct benefit to the railroad by the adoption of the Neosho Plan is quite apparent, but according to J. M. Mallory, general industrial agent for the Central of Georgia, the indirect benefit is still greater, for it encourages the building on a permanent basis of a better relationship between business men and between town and country. When the railroad introduces this plan to a community, it cannot fail to gain a personal contact and good-will from the business men of that community.

A few examples will indicate what the concrete benefits to the communities which have adopted the plan and have followed it religiously, have been.

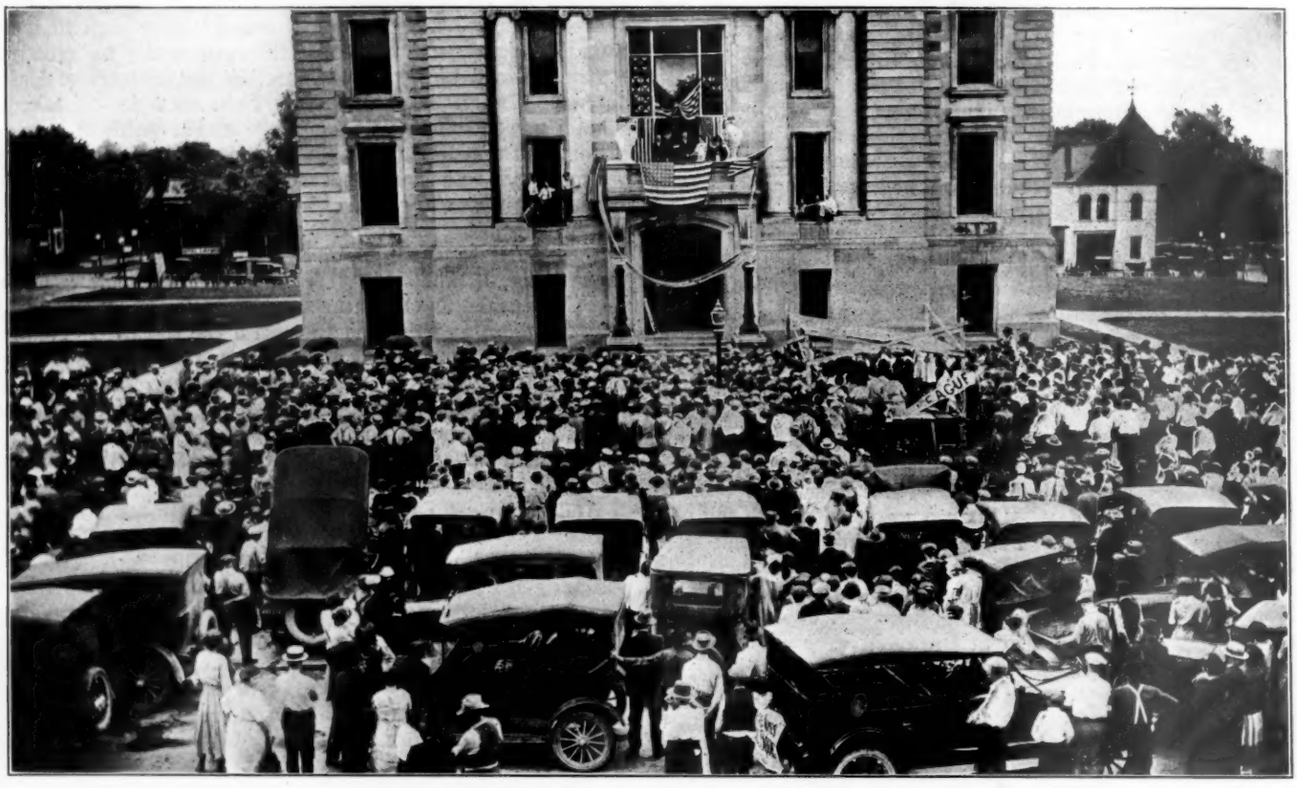
The Richland, Georgia, club held a co-operative hog and cattle sale in connection with its Golden Rule sale and sold 50 head of cattle and a number of hogs, the sale totaling $6,500.

The Eufaula, Ala., club reports some unusual sales records of its members as a result of a Golden Rule sales day. A clothing concern had a 290 per cent increase in sales, a dry goods store a 500 per cent increase, a grocery store a 404 per cent increase and a 5 and 10 cent store a 350 per cent increase.

Of course many of the clubs are carrying on other activities to benefit their communities in addition to the Golden Rule sales days. Some clubs are working with the banks and doing much to introduce pure bred dairy cows and the establishment of boys' and girls' calf clubs. Others are encouraging the breeding of pure bred hogs and chickens. Some are promoting the organization of co-operative creameries and grain elevators, and almost all are boosting for good roads.

All of the railroads which have adopted the Neosho plan are enthusiastic over the results achieved. Many of the towns along the road which were at a standstill for years are showing renewed vigor and both the incoming and outgoing freight tonnage is growing month by month; the public is showing a greater good-will and appreciation of the railroad, and the employees, especially in the towns affected, are devoting greater interest and energy to the promotion of the business of the road.

So here is a great, new income-producing empire awaiting annexation. No new tracks, no new rolling stock, no additional help except an organizer or two and no new capital is needed to put it in operation. It is an opportunity to make two roses bloom where but one has bloomed before.



View of Neosho Sales Day Gathering at Robinson, Ill.

FOLLOWING CLOSELY on the announcement of the Mechanical division of the American Railway Association that it will hold its annual convention at Atlantic City on June 11-18, 1924, as stated in the *Railway Age* of November 10, the Pennsylvania System has announced that it will operate a special train in two sections from Chicago to Atlantic City, leaving Chicago at 1 p. m., Monday, June 9, and arriving at Atlantic City at 10:30 the following morning, making intermediate stops at Englewood (Chicago), Fort Wayne, Ind., Lima, Ohio, Crestline, Alliance and Pittsburgh, Pa. These trains, each of which will consist of ten cars, will contain the same equipment as the Broadway Limited.

The National Cost of Railroad Accidents*

Government Records of Casualties for 36 Years — Magnitude of Problem Illustrated—Remarkable Accomplishments

By Lew R. Palmer
Conservation Engineer, The Equitable Life Assurance Society of the United States

WHEN ONE realizes that the railroad industry of the United States involves approximately two million employees (2,072,971, year 1920) it becomes evident that railroad safety is not only a *railroad* problem, but is unquestionably a national problem; and all can view with deep interest the splendid work now being done along preventive lines by the various railway units throughout the country. This very large exposure in a comparatively hazardous industry naturally carries with it a correspondingly heavy toll of accidents, and it is fortunate that there are available, through the Interstate Commerce Commission, relatively complete statistics, which should assist railroad safety men and their respective managers in promoting preventive measures.

Of these I. C. C. accident statistics Dr. Lucian W. Chaney says in a recent publication:† "No other American industrial group has been recorded with equal completeness for so long a time. The most significant column is that of employees killed. While the number is irregular, it shows a distinct tendency to decline, which would be conspicuous if it were possible to relate these occurrences to the greatly expanding volume of employment during these years. The very great increase in injuries until about 1916 in part is due to the expansion of railway operations and in part reflects a more complete recording than was possible in earlier years. The number of 'other persons' killed bears startling testimony to the steady increase of hazard to the general public from the grade crossing. A very large part of these casualties are due to the growth of automobile traffic."

Chart 1 has been developed on a five-year basis, and the importance of railroad accident prevention is emphasized by the magnitude of the figures shown. Chart 1A gives the totals for 36 years, 1888 to 1923 inclusive. The fact that these accidents have occurred over a period of years and are an accumulation of relatively small day-by-day casualty lists—as is the case in general with our industrial and public accidents—is no doubt responsible for their passing more or less unnoticed as compared with tragedies such as that which has recently befallen Japan, arousing the sympathy of the entire civilized world in the appalling loss of life. It would be unpardonable to speak lightly, in any sense, of this terrible catastrophe, which was unforeseen and apparently unpreventable. But does it not serve to bring home to us the amazing fact that an even greater sacrifice of life stands charged against a single industry of the United States; and that, in contrast, this loss of life is due very largely to preventable causes?

While one cannot measure human life in terms of dollars, we know that waste of life carries with it a very material waste of the nation's productive power. From insurance records and estimates of life expectancy it is possible to assign an approximate economic value to a group of lives of varying ages. From the Proceedings of the Eighth Annual Safety

Chart 1

PASSENGERS, EMPLOYEES, AND OTHER PERSONS KILLED IN REPORTABLE STEAM RAILROAD ACCIDENTS IN THE UNITED STATES FOR FIVE-YEAR PERIODS FROM 1889 TO 1922, INCLUSIVE

Five year period	Number of persons killed		
1889	Passengers.	1,464	
to	Employees.	12,364	
1893	Other per..	19,752	
Inc.	Total	34,680	
1894	Passengers.	1,118	
to	Employees.	9,146	
1898	Other per..	22,063	
Inc.	Total	32,327	
1899	Passengers.	1,470	
to	Employees.	14,010	
1903	Other per..	26,391	
Inc.	Total	41,871	
1904	Passengers.	2,328	
to	Employees.	18,861	
1908	Other per..	31,205	
Inc.	Total	52,394	
1909	Passengers.	1,509	
to	Employees.	16,944	
1913	Other per..	31,896	
Inc.	Total	50,349	
1914	Passengers.	1,217	
to	Employees.	14,238	
1917	Other per..	32,920	
Inc.	Total	48,375	
1918	Passengers.	1,381	
to	Employees.	11,238	
1922	Other per..	22,924	
Inc.	Total	35,543	

Chart 1A

TOTAL NUMBER OF PASSENGERS, EMPLOYEES, AND OTHER PERSONS KILLED IN REPORTABLE STEAM RAILROAD ACCIDENTS IN THE UNITED STATES 1888 TO 1922 INCLUSIVE

	Number Killed
Passengers.	10,802
Employees.	98,871
Other per.	190,048
Grand total	300,821

*From an address delivered before the steam railroad section, at the twelfth annual safety congress of the National Safety Council, at Buffalo, October 4, 1923.

†Bulletin No. 339, United States Bureau of Labor Statistics.

Congress, 1919, we find that the late Dr. F. S. Crum estimated that the 45,000 public fatalities which occurred during the year 1917 resulted in an economic loss to the nation of $557,289,000. On the basis of this calculation (the estimated productive value of a life at the average age at death being $10,377) the 300,821 railroad fatalities for the 36 years, 1888-1922 entailed an economic loss to the nation of $3,121,619,517. What Dr. Crum would charge us for the 3,552,931 reportable injuries which occurred during this period can only be approximated. On the basis of his $1,671,867,000 charge for 5,625,000 public injuries recorded as occurring in 1917 ($300 per injury) it is safe to assume that he would charge our railroad casualty account with at least $1,066,779,300, or a total economic waste for the 36 years of more than $4,188,398,817.

Chart 1 shows the variation in the number of fatalities for "Passengers," "Employees," "Other Persons" and "Total." It is generally conceded that in the earlier stages of accident statistics the records of fatalities were more complete than the records of injuries, and for this reason Chart 1 is shown on a fatality basis. The striking feature of this chart is the comparatively large number of fatalities to "Other Persons," a fact that justifies serious consideration. Fortunately, during the last five-year period (including the year 1922) the number of fatalities recorded under this classification was reduced by 10,000. The number of fatalities to employees recorded in the last five-year period was the lowest for any period with the exception of the second.

Chart 1-A compares the total number of "Passengers," "Employees," and "Other Persons" killed in reportable steam railroad accidents in the United States during the years 1888 to 1922, inclusive. The fact is again revealed that "Other Persons" is a class of railroad accidents that demands special attention.

Chart 2, based on information on file at the Interstate Commerce Commission, shows that for the seven years from 1916 to 1922, inclusive, there has been a "Transportation Waste" due to personal injuries, clearing wrecks and property damage, of $378,299,789.

Chart 2

"Transportation Waste," Class 1 Steam Railroads
(Not including switching and terminal companies)

Years 1916 to 1922 Inclusive

Year	"Transportation Waste" due to—	
1916	Total inj.....	$29,485,700
	Clear. wrecks.	5,163,122
	Dam. to prop.	3,861,769
	Total	38,510,591
1917	Total inj.....	33,699,135
	Clear. wrecks.	7,889,955
	Dam. to prop.	4,553,502
	Total	46,142,592
1918	Total inj.....	33,369,199
	Clear. wrecks.	14,504,371
	Dam. of prop.	4,794,750
	Total	52,668,320
1919	Total inj.....	37,254,954
	Clear. wrecks.	14,049,662
	Dam. to prop.	5,883,293
	Total	57,187,909
1920	Total inj.....	56,338,169
	Clear. wrecks.	20,887,706
	Dam. to prop.	10,100,089
	Total	87,325,964
1921	Total inj.....	31,935,423
	Clear. wrecks.	9,967,746
	Dam. to prop.	6,336,097
	Total	48,239,266
1922	Total inj.....	33,417,497
	Clear. wrecks.	9,451,022
	Dam. to prop.	5,356,628
	Total	48,225,147

"Transportation waste"
Years 1916 to 1922 inclusive

Total injuries	$255,500,077
Clearing wrecks	81,913,584
Damage to property	40,886,128
Grand total	378,299,789

Chart 3

Ratio of Transportation Waste to Total Revenue, Class 1 Steam Railroads
(Not including switching and terminal companies)
Years 1911 to 1922 Inclusive

Year	Total railway operating revenue	Total waste	Ratio of "waste" to total Revenue
1911	$2,692,518,403	$63,339,439	2.35
1912	2,744,342,277	65,812,238	2.40
1913	3.043,324,782	74,606,274	2.45
1914	2,969,898,838	79,677,345	2.68
1915	2,871,563,047	67,864,316	2.36
1916	3,381,597,866	61,911,597	1.83
1916	3,596,865,766	65,607,043	1.82
1917	4,014,142,747	85,745,052	2.14
1918	4,880,202,255	113,493,816	2.33
1919	5,144,466,361	167,830,504	3.26
1920	6,178,192,428	216,057,347	3.50
1921	5,516,556,455	134,267,730	2.43
1922	5,559,092,708	91,009,479	1.63

Note:—Years 1911 to 1916, inc. ending June 30th.
Years 1916 to 1922, inc. ending Dec. 31st.

"Total waste" includes:—Cost of injuries to persons; clearing wrecks; damage to property; damage to live stock on right of way; loss and damage to freight and baggage.

Chart 3 shows the ratio of total transportation waste as compared with total revenue for the years 1911 to 1922, inclusive. It is gratifying to note that the year 1922 shows the lowest ratio for the period covered.

Chart 4 shows the annual personal injury expense 1916-1922, inclusive, as well as the ratio of personal injury expense to total "transportation waste" expense.

Chart 5 indicates the waste in life resulting from collisions year by year, 1906 to 1922, inclusive; 6,325 persons were killed and 98,461 injured during that period, with a total

damage to railroad property of $86,563,474. [Damage to merchandise in these collisions, also sums paid to employees and passengers for or on account of bodily injury, or death, not included.] Of the total 110,084 collisions there were recorded 17,550 rear-end and 9,512 head-on collisions. During the year 1922 there were 508 rear-end and 257 head-on collisions, a total of 765. Of these, the records show that 737, or 96 per cent, are charged to negligence of employees. It would be interesting to know how many of these employees had served on safety committees.

It is most gratifying to see the remarkable reduction made in the number of total casualties; and, while the property damage account still stands charged with an average of more than $6,600,000 for each of the last three years, the amount charged to the personal injury expense account must have shown a material reduction. It is unfortunate that the 1921 record could not have been maintained during 1922.

An analysis of the records for 1920, 1921 and 1922, dis-

Chart 4

"Transportation Waste," Chart Showing Ratio of Annual Personal Injury Expense to Total Waste Expense, Class 1 Steam Railroads
(Not including switching and terminal companies)

Years 1916 to 1922 Inclusive

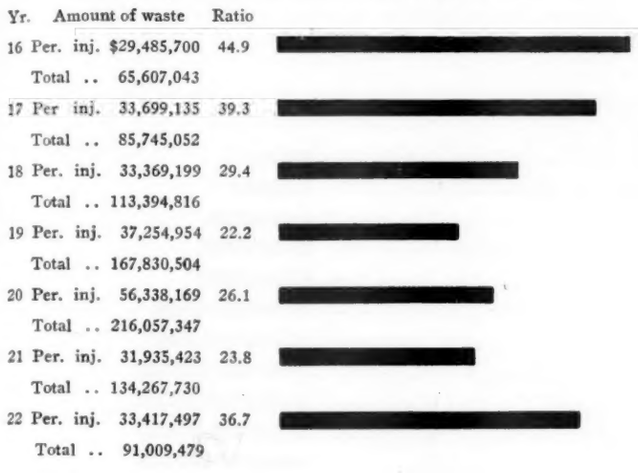


Chart 5

Total Casualties Resulting from Collisions, Steam Railroads, for Years 1906 to 1922, Inclusive

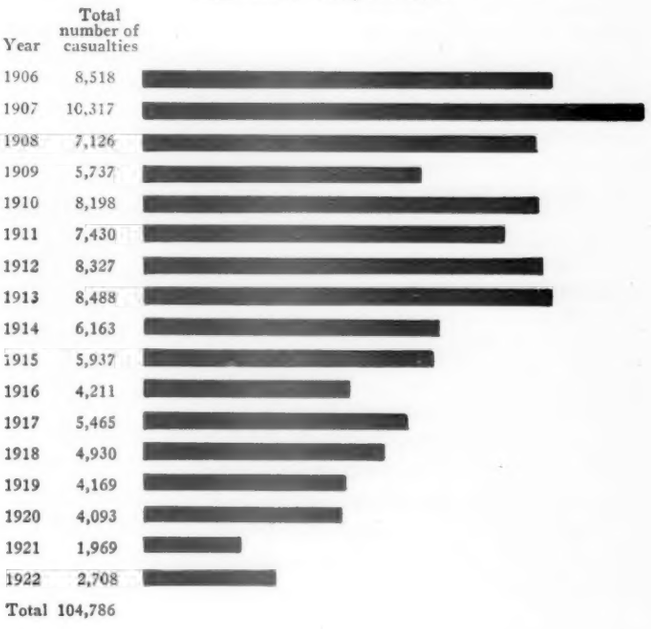


Chart 6

Chart Showing Frequency Rates of Train and Train Service Non-Fatal Casualties to Employees on Duty, by Class of Employment, Class I Steam Railroads; Compared with Two Eastern and Two Western Roads Having Low Frequency; Year 1922

Service	Class		Average number in service	Average number injured per month	Average injured per month per 100 in service
Road passenger service.	Conductors, assistant conductors, collectors..	Four roads.....	811	0.42	0.05
		All Class I roads...	11,380	23.50	0.21
Road passenger service.	Brakemen and flagmen.....	Four roads.....	1,268	2.50	0.197
		All Class I roads...	14,350	47.50	0.331
Yard service.....	Enginemen and motormen.....	Four roads.....	1,057	1.25	0.12
		All Class I roads...	18,703	62.17	0.332
Road passenger service.	Baggagemen	Four roads.....	382	0.75	0.196
		All Class I roads...	5,729	25.67	0.45
Road Freight service...	Enginemen and motormen.....	Four roads.....	2,182	4.00	0.18
		All Class I roads...	29,372	137.42	0.467
Yard service.....	Firemen and helpers.....	Four roads.....	1,083	1.83	0.17
		All Class I roads...	19,249	90.17	0.468
Road passenger service.	Enginemen and motormen.....	Four roads.....	978	1.83	0.19
		All Class I roads...	12,710	59.58	0.469
Yard service.....	Conductors and foremen.....	Four roads.....	1,050	4.92	0.47
		All Class I roads...	18,639	117.83	0.63
Road passenger service.	Firemen and helpers.....	Four roads.....	812	2.25	0.28
		All Class I roads...	12,491	95.33	0.76
Road freight service...	Conductors, through, local and way.....	Four roads.....	1,580	6.67	0.42
		All Class I roads...	23,254	185.58	0.80
Road freight service...	Firemen and helpers.....	Four roads.....	2,299	7.09	0.31
		All Class I roads...	31,507	272.83	0.87
Road freight service...	Brakemen and flagmen.....	Four roads.....	4,145	31.50	0.76
		All Class I roads...	57,746	634.42	1.10
Yard service.....	Brakemen and helpers.....	Four roads.....	2,664	24.33	0.91
		All Class I roads...	46,953	630.17	1.34
Total		Four roads.....	20,311	89.33	0.44
		All Class I roads..	302,083	2,382.17	0.79

Note: Two Eastern and two Western roads.
Class I steam railroads.

closes the fact that there is an even greater waste in railway property charged against derailments than is charged to collisions, as shown in the following statement:

Year	Railroad property damage due to collisions	Railroad property damage due to derailments
1920	$9,078,110	$22,987,790
1921	4,657,390	16,518,440
1922	6,176,780	14,969,250
Total	$19,912,280	$54,475,480

A comparison of the totals indicates that the amount of damage due to derailments is more than two and one-half times the damage to property due to collisions; and assuming that a two-to-one ratio would hold for the period 1906 to 1922—which shows a property damage due to collisions of $86,563,474—it is estimated that the property damage due to derailments would amount to $173,126,948 with a combined property damage of $259,690,422.

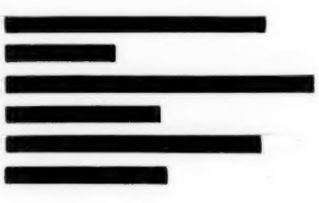
These money costs of railroad accidents have been analyzed and graphically shown with the one purpose of revealing causes of waste, and to furnish the railroad safety man with additional ammunition with which to help him fight the good fight.

It has long been recognized that a dollar saved is a dollar earned. Prevention of railroad accidents reduces waste of life, personal injury expense and property damage, and it is

Chart 7

CHART SHOWING NON-FATAL CASUALTIES TO EMPLOYEES ON DUTY PER MILLION MAN-HOURS INCLUDING ALL BRANCHES OF EMPLOYMENT COMPARING DISTRICTS WITH LEADING RAILROAD IN EACH DISTRICT, CLASS 1 STEAM RAILROADS, YEAR 1922

District or Railroad	Million Man-hours	Number Injured	Number Injured per Million Man-hrs.
Western Dis.	1,634.4	40,934	25.046
U. P. System	132.2	1,359	10.279
Eastern Dis..	1,861.5	54,653	29.360
D. L. & W...	56.8	832	14.639
Southern Dis.	746.4	17,926	24.017
C. & O.....	58.3	879	15.076



difficult to understand why progressive management will ease up on safety work as an economy measure. Is not this a penny-wise-and-pound-foolish policy? For, unfortunately, the pound sterling in this case also carries with it the pound of flesh.

Illustrating the condition above cited, we quote from the September bulletin of one of our leading railroads. Relative to the increase and subsequent decline in casualties we read:

"This indicates that we are gradually recovering from the set-back received by cancellation of safety meetings and general let-up in safety work by the safety committeemen for five months during the latter part of 1922."

In support of the effectiveness of uninterrupted organized safety work decrease of approximately 20 per cent in the accident frequency rate has been recorded by one of our large railroad systems for the year 1922 as compared with the 1921 figures; and this notwithstanding the fact that the average record of all Class I railroads throughout the United States showed an increase of approximately 15 per cent during that period.

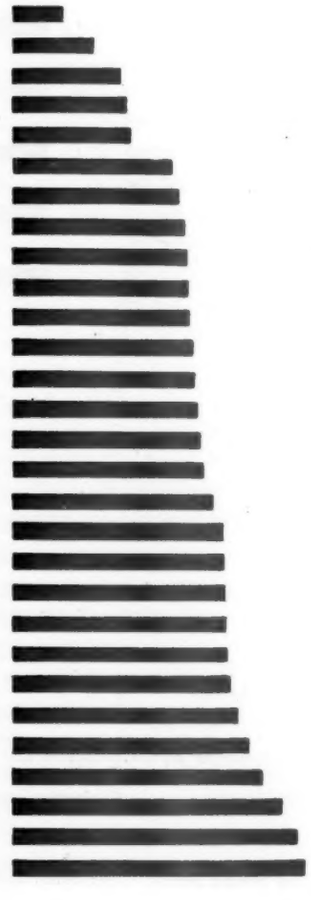
For this present year, 1923, this road has shown a further reduction; a frequency rate of 7.91 for the first six months; this compared with the 1921 record of 12.70 indicates a reduction of 37.7 per cent.

Chart 6 is a comparison of the non-fatal accident frequency rates of train and train-service accidents by occupations, between the average for all Class I railroads and two eastern and two western roads having low frequency rates. In every instance the "bogey" record is well under the average rate, and, in some cases, 50 per cent to 75 per cent. Certainly these figures furnish positive evidence that *"It Can Be Done."* In fact, the only justifiable reason for the compilation of

Chart 8

INJURIES TO EMPLOYEES ON DUTY PER MILLION MAN-HOURS, IN TRAIN, TRAIN-SERVICE AND NON-TRAIN ACCIDENTS, CLASS I STEAM RAILROADS, HAVING 50,000,000 OR MORE MAN-HOURS, YEAR 1922

Rank	Name of Road	Injuries	Man-hours Thousands	Injuries per Million Man-hours
1	U. P. R. R..	432	70,505	6.13
2	U. P. Sys...	1,359	132,210	10.28
3	S. P. Co.....	1,956	142,427	13.73
4	D., L. & W..	832	56,835	14.64
5	Ches. & O....	879	58,306	15.08
6	Erie	1,098	52,998	20.72
7	Lehigh V....	1,128	52,538	21.47
8	S. L.-S. F....	1,399	62,914	22.24
9	Southern Ry..	2,940	131,509	22.36
10	C., M. & S. P.	2,827	124,960	22.62
11	Atlantic C. L.	1,286	56,388	22.81
12	Boston & M.	1,620	69,209	23.41
13	S.P.L. inT.&L.	1,315	55,158	23.84
14	Northern P...	1,808	74,752	24.19
15	Norf. & West.	1,542	63,625	24.24
16	Illinois Cent.	3,546	143,497	24.71
17	N.Y.,N.H.&H.	2,292	89,026	25.74
18	C., Bur. & Qu.	3,289	120,219	27.36
19	At., T. & S.F.	4,684	170,606	27.45
20	N. Y. Central.	5,866	213,233	27.51
21	Phila. & Read.	1,785	64,556	27.65
22	Louis. & Nash.	3,267	117,449	27.82
23	Gt. Northern..	2,119	75,012	28.25
24	Chic. & N. W.	3,448	117,596	29.32
25	C.,C.,Ch.&St.L.	1,540	50,635	30.41
26	Ch.R. I. & Pac.	2,955	91,210	32.40
27	Balt. & Ohio.	5,361	154,292	34.75
28	Penn. System.	19,367	528,169	36.67
29	Missouri Pac.	3,190	84,169	37.90



such accident statistics is for the purpose of stimulating the competitive spirit that already exists and is unquestionably very largely responsible for the marked reduction made in railroad accidents during the past 10 years through preventive methods adopted.

In an endeavor to further stimulate the contest spirit we submit Chart 7 showing non-fatal casualties to employees on duty per million man-hours in all branches of employment, being a comparison of the average frequency rates of the different districts with the frequency rates of the roads having the best records in the respective districts for the year 1922.

Had all Class I railroads of these three districts attained the frequency rate of the record road within their respective districts it is estimated that there would have been a 58 per

cent reduction in the Western District; 50 per cent in the Eastern District, and 37 per cent in the Southern District. These reductions would have resulted in a saving of more than 58,000 injuries in the three districts for the year 1922, and, on the basis already used ($300 per injury) would have effected a saving of $17,400,000. (For the first eight months of 1923 the Union Pacific System shows an accident frequency of 7.738, which is a 24.7 per cent reduction as compared with the 10.279 average frequency of the system for 1922 as shown on Chart 7.)

Chart 8 has been developed from Interstate Commerce Commission data covering train, train-service and non-train accidents to employees on duty, and is merely a rearrangement according to accident frequency of the alphabetical records contained in I. C. C. Bulletin 87. This group (with one of smaller roads, not shown) might properly be termed the "Major" and "Minor" Leagues, and while it is not practicable for more than one road to head the batting list, it certainly is possible for all roads to improve their batting average. The Union Pacific Railroad, which, according to the Interstate Commerce Commission records, holds first place, has only attained this position through the persistent effort of a well-organized safety department having the active support of the executive officials who have truly given safety right-of-way in the operation of their railroad. The reduction of approximately 80 per cent that has been made in this road's accident frequency has not just happened. It has required an organization which has warranted and demanded the co-operation of the employees themselves, on which naturally rests the success of any safety program. Another element in the work done by this road is the fact that the field of analysis of accident causes has been extended from the standard I. C. C. reportable accidents—three or more days' lost time—to the *one-day lost-time cases* (where the injured person loses more than the remainder of the day) and utilized the information thus obtained in developing preventive methods.

Chart 9

CHART SHOWING NON-TRAIN CASUALTIES (NON-FATAL) TO EMPLOYEES ON DUTY, CLASS I STEAM RAILROADS

(Roads having an excess of 50 million man-hours, including all branches of employment) Year 1922

Railroad	Non-train million man-hours	Injured	Number injured per million man-hours
U. P. R. R. Co.	56.6	315	5.57
O. W. R. R. & N.	18.9	161	8.53
L. A. & S. L.	12.0	132	10.96
So. Pacific	122.3	1,437	11.75
D. L. & W.	46.6	655	14.07
C. & O.	45.8	648	14.16
O. S. L.	20.3	342	16.87
Lehigh	42.6	775	18.21
At. Coast L.	47.5	880	18.51
St. L. & S. F.	52.6	1,016	19.33
C. M. & S. P.	102.2	2,066	20.22
S. P. (T. & La).	47.8	1,005	21.04
So. Railway	84.7	1,793	21.18
C. B. & Q.	98.6	2,124	21.55
Boston & M.	58.1	1,293	22.24
N.Y., N.H. & H.	74.1	1,655	22.33
Norfolk & West.	52.8	1,185	22.44
L. & N.	97.0	2,199	22.67
No. Pacific	52.6	1,422	22.73
Phila. & R.	51.6	1,202	23.32
Gr. Northern	62.3	1,463	23.49
N. Y. Central	199.6	4,729	23.69
Ill. Central	103.0	2,511	24.38
C. & N. W.	95.9	2,451	25.55
Erie	34.0	960	28.27
C. R. I. & P.	74.6	2,298	30.79
B. & O.	124.9	3,993	31.98
A. T. & S. F.	124.5	3,986	32.02
Missouri Pac.	70.4	2,409	34.23
Pennsylvania	419.5	14,877	35.46
Total	2,502.9	61,982	24.76

As a further illustration of the money to be saved through organized safety work, on the basis of a 6.127 frequency rate as recorded for the Union Pacific (Table 100, Page 79, I. C. C. Bulletin 87) figured against the average frequency rate shown for all districts (Table 100, Page 76, I. C. C. Bulletin 87) it can be estimated that, had all roads attained this 6.127 frequency rate for 1922, there would have been effected a 77 per cent reduction in the number of casualties and a corresponding reduction in the personal injury expense, amounting to a saving of 88,585 casualties and $25,734,813 (personal injury expense 1922, $33,417,497—see Chart 4), a saving that unquestionably can be effected through increased application of up-to-date organized safety methods.

These competitive charts have been developed on the basis of injuries not only because this classification is considered a more conclusive measurement of relative risk factors, but for the further reason that the fatality percentages only include such deaths as occur within 24 hours of the time of injury, and the Interstate Commerce Commission records show that approximately 10 per cent of the total number of persons killed are recorded under the heading of "subsequent fatalities"—a discrepancy that materially discounts the value of our railroad fatality statistics.

Chart 9 covers non-train injuries to employees on duty, and was developed from information received from the Interstate Commerce Commission.

Notwithstanding the vast amount of money spent by the railroads for the installation of automatic block signals—one of the most effective life-saving devices ever invented—the "personal equation" still stands charged with a heavy loss of life and millions of dollars wasted through property damage. Indifferent flagging, kicking knuckles, and violations of the blue flag rules, are also phases of the "human factor" problem as yet unsolved. Educational methods have accomplished a great deal, and are the hope of the immediate future.

The disorganization resulting in the railroad industry, as well as other industries, during and subsequent to the war is being gradually overcome. This situation has been aptly described as—"The iron horse, well curried but poorly fed; over-regulated; nearly strangulated; almost dead." The railway safety men in particular, and the public in general, view with sincere appreciation the rehabilitation of our railroad systems through the expenditure in 1923 of $1,540,000,000 to insure safe and dependable service—a much-needed and very acceptable contribution to the cause of national safety.

Conclusion

Those of us who have paused in front of the New York Public Library have been impressed with the inscription that is carved on the Fifth avenue façade above the figure of Truth—

"But Above All Things Truth Beareth Away the Victory." It is in a spirit of truth and fairness that the facts embodied in this paper have been submitted, with the purpose of indicating the more dangerous sectors of our battle front, as well as to furnish some striking examples of what has been accomplished by an organized and persistent offensive against preventable railway accidents.

While much good work has already been done, the fact remains that an even greater task confronts us, and, in the words of the indomitable Theodore Roosevelt—*"Success can only come to the player who 'hits the line hard.'"*

Can there be a more fitting slogan for the men in the ranks of Railroad Safety than the message of immortal fame—*"Let Us Cherish Within Our Hearts the Memory of Our Fallen Comrades. Salute Them! Then Forward!"*—*McAlexander.*

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading during the week ended November 17 showed a rather sharp decline as compared with the previous weeks, the drop to be expected at this time of the year being accentuated by some decrease in loading on Armistice Day. The total was 991,745 cars, which was an increase of 34,181 as compared with the corresponding week of last year and of 201,382 as compared with 1921. As compared with the corresponding week of last year, there was a decrease in the loading of grain and grain products, coal and coke, but all other classes of commodities showed increases. Coal loading was 20,000 cars less than the preceding week.

With the seasonal decline in loading the freight car surplus has been increasing for two weeks. For the first week in November the total surplus was 31,955, while at the same time there was a shortage of 7,099. For the second week in November the average surplus was 71,119, including 34,449 box cars, while the average shortage was only 3,901, including 831 box cars and 1,169 coal cars.

The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT LOADED
Week Ended November 17, 1923

Districts	1923	1922	1921
Eastern	234,873	247,062	202,912
Allegheny	195,573	203,929	163,931
Pocahontas	39,031	30,509	31,391
Southern	142,722	136,102	117,561
Northwestern	148,189	130,333	96,926
Central Western	158,802	151,296	116,892
Southwestern	72,555	58,333	60,750
Total Western Dist.	379,546	339,962	274,568
Commodities			
Grain and grain products	48,027	55,061	37,841
Live stock	41,428	40,715	34,292
Coal	170,875	200,791	168,438
Coke	10,750	12,474	6,464
Forest products	72,527	60,898	50,475
Ore	45,049	33,102	8,335
Mdse. L.C.L.	247,711	228,010	229,307
Miscellaneous	355,378	326,513	255,211
Total	991,745	957,564	790,363
November 10	1,036,067	944,186	755,777
November 3	1,035,776	979,851	837,576
October 27	1,073,965	999,718	951,384
October 20	1,072,881	989,889	964,811
Cumulative loading for year to date	44,683,473	38,101,745	35,245,268

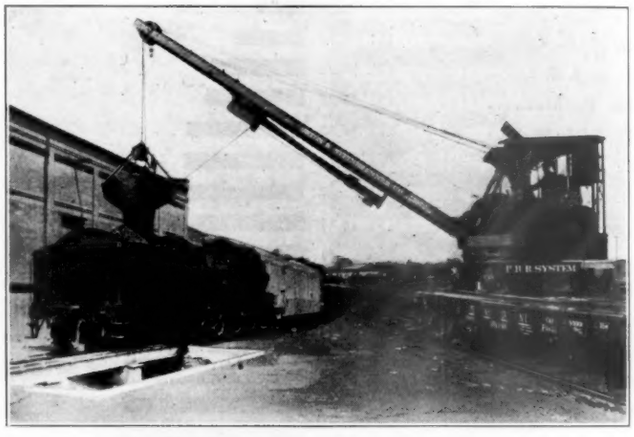
Despite the fact that lake navigation will not close until next week, more coal has already been transported so far this season by the railroads and dumped at Lake Erie ports for shipment up the Lakes than ever before on record. Up to November 27, according to reports to the Car Service Division, 30,618,000 tons have been dumped since January 1. Of that amount 29,036,000 tons was cargo and 1,582,000 tons was bunker coal. By the time the navigation season closes it is estimated that a total of 31,313,000 tons will have been dumped, of which 29,700,000 tons will be cargo coal and 1,613,000 tons bunker coal. Shipment of this record amount of coal has been accomplished in practically seven months without congestion or any serious accumulations and with virtually no car shortage.

The best previous record was made in 1918 when 29,388,242 tons of both cargo and bunker coal were transported by the railroads and dumped at Lake Erie ports during the entire season.

Small Crane for Railroad Service

THE LIGHT, GENERAL-PURPOSE CRANE illustrated is now being produced by the Orton & Steinbrenner Company, Chicago, for use about railroad shops, enginehouses, scrap docks, yards, etc. It is designed for mounting on a flat car; it will travel the length of the car, revolve in a full circle, and yet keep within all railroad clearances. The length of the boom is 28 ft., which enables it to be shipped anywhere on a 40-ft. car.

The crane is equipped to handle with equal facility, hook, bucket or magnet. The maximum capacity is seven tons at 12 ft. radius; or it will handle a ½- or ¾-cubic yard bucket with the boom extended to 28 ft. radius; or a 36-in. electromagnet handling a length of 130-lb. rail, weighing 1,430 lb., at the maximum radius. The wheels of the car are spaced



Orton & Steinbrenner Gasoline Motor-Operated Crane Coaling a Locomotive

6 ft. 6 in. on centers, thus giving a wide base for stability. The boom measures 28 ft., center to center, thus providing long enough reach to unload rails from a car in front or behind the crane car on the same or adjacent track.

Power is furnished by a four-cylinder, 5-in. by 6½-in., heavy-duty gasoline motor, with high tension magneto. This motor is geared directly to the hoisting, swinging and traveling gears. It is operated by one man only. A generating set, belt-connected to the engine, furnishes current for a 36-in. electro-magnet. This device is valuable in handling magnetic materials such as rails, switches, frogs, truck side frames, wheels, etc. Bucket handling drums are also furnished on the machine. A ¾-cubic yard bucket will hold on an average one-half ton of coal, and at a rate of two trips per minute, the machine will handle about 30 tons of coal an hour. As an emergency locomotive coaler, this crane can therefore be used to advantage. At the maximum radius, 30 ft. from the center of the machine, the crane can handle 4,400 lb.

A separate shaft with two niggerheads is supplied on the front of the crane. These are useful in pulling cars and dragging in loads to a position where they can be handled on the boom. The novel feature of this crane is its movability, both over a division and on its own car. Moreover, being gasoline-motor driven, it is always ready for service without any preliminary firing, nor is any trouble encountered from bad water or lack of ready coal supply.

Consolidation Hearings Practically Concluded

Commission Has Difficulty in Securing D. T. & I. Data—Statement of Conclusions Presented by J. E. Oldham

WASHINGTON, D. C.

HEARINGS on the Interstate Commerce Commission's tentative consolidation plan, at which about 12,000 pages of testimony and nearly 700 exhibits have been received, which the commission is to consider in formulating a "final" plan, after hearing oral arguments beginning on January 7, were concluded on November 23 except for the testimony of the Detroit, Toledo & Ironton.

The commission thus far has been unsuccessful in getting any testimony from the Ford road, even in response to a subpoena for E. G. Liebold, its vice-president, and after a United States marshal had returned the summons from Detroit, reporting that he had been unable to serve it, the question of what further steps, if any, are to be taken in the matter was to be considered by the commission in conference. However, on Tuesday it was announced that Mr. Liebold would appear on December 4. The subpoena was issued on November 23 after all the other testimony had been submitted and an adjournment until Saturday, then Monday and then Tuesday was taken to give an opportunity for a witness for the D. T. & I. to appear. On Saturday a telegram was received from Detroit stating that Mr. Liebold was out of the city. The D. T. & I. is grouped in the commission's tentative plan with the proposed Pere Marquette system, No. 6. It is understood that the commission does not necessarily insist on any expression of opinion from the road as to what disposition should be made of it in the consolidation plan, but it does expect from each road certain basic statistics as outlined in a questionnaire prepared by a committee of railroad counsel, which calls for a map of the road, and data as to its traffic interchange with connections, for example, together with certain other information not ordinarily kept in the commission's files. This data has been furnished at least by all the other Class I roads. It is also understood that the commission has received a letter from the D. T. & I., not yet placed in the public record of the hearings, which raises some questions as to which testimony is desired. The D. T. & I. on several occasions since it was acquired by Mr. Ford has been rather slow in responding to the commission's requests or orders for reports such as are filed by other roads.

Oldham Outlines Principles of Consolidation

John E. Oldham, of Merrill, Oldham & Co., Boston, presented on November 23, at the request of the commission, a statement of conclusions regarding the subject of railroad consolidations. Mr. Oldham said that the provisions of the transportation act relating to consolidations are primarily the logical result of the method of rate-making provided by the act; that one of the major problems to be solved in the process of consolidation is "to bring about such a capital reorganization as shall make capitalization consistent with property value," and that a second major problem is the distribution among the stronger systems of the roads which are unable to derive from rates adequate for roads as a whole an income which will enable them to furnish adequate service. His conclusions, he said, are based upon a recognition of the following:

1. That the railroad policy of the United States is that the railroads are to be privately owned and managed, are to be operated on the competitive rather than the monopolistic principle and are to be under public regulation.
2. That the permanency of this policy is dependent upon the ability of the railroads to furnish adequate service under such rates and other conditions as may be established by the regulatory code.
3. That the ability of the railroads to furnish adequate service is dependent upon the receipt by them of an income sufficient to induce their owners or other investors to furnish them with additional capital as needed.
4. That no system of rate making can be based upon the condition or position of each individual road, but must be based upon the condition and position of the railroads as a whole.
5. That even though the system of rate making must be based upon average rather than individual conditions, yet the success and permanency of such a system can be assured only if all railroads subject to it shall be able to attain similar financial and operating results and that obviously such similar results can be attained only if the railroads themselves are similar in character, each approximating the character of the railroads as a whole in the territory which it serves.
6. That Congress, recognizing the necessity of providing adequate income for the railroads, has defined such income as being an amount sufficient for a fair return upon the value of the property used in the service of transportation, and has provided a method of rate making designed to produce in the aggregate a railroad income equal to such fair return upon the aggregate value of such railroad property.
7. That Congress, also recognizing the necessity of providing for railroads of average or uniform character in order that each may obtain a similar income from the system of rate making then provided, inserted the provisions relating to consolidations. The underlying purpose of which is to establish railroad units of such uniform character as is necessary to secure the successful application of the rate-making provisions of the Transportation Act.

Units Not of Uniform Character

"The units of the rail transportation system of the country as they exist today are not of uniform character," Mr. Oldham said. "In the pamphlet entitled, 'A Plan for Railroad Consolidations' herewith offered as an exhibit, I have analyzed this matter of dissimilarity. My analysis shows

"1. That roads which handle about 85 per cent of the business of the country handle that business at such similar cost that the net results of operation are similar for all of them.

"2. That of the roads in this group, roads which handle about 60 per cent of the country's business have been able in times when rates were recognized to be adequate for railroads as a whole to pay from their net incomes fixed charges and dividends on all issues of outstanding capital stock and in so doing have averaged to distribute to their security holders approximately 80 per cent of their net income about equally divided between fixed charges and dividends.

"3. That the remaining roads of this 85 per cent group, namely roads which handle 25 per cent of the country's business, from a similar amount of net earnings have likewise distributed 80 per cent, practically the whole of which has been in the form of fixed charges, leaving no balance for dividends, if the same proportion of net earnings is to be carried to surplus account.

"4. That roads where costs of operation are such as to prevent their obtaining a similar amount of net income are roads which handle not over 15 per cent of the country's business.

"A study of such valuation data as has been published by the commission clearly indicates that property values are similarly related to both gross and net earnings as shown by the average of both the 60 per cent and 25 per cent groups. It indicates further that the total capitalization of the 60 per cent group is consistent with reproduction value of property, but that in the case of the 25 per cent group total capitalization of these carriers exceeds such valuation.

Weak Roads—Faulty Capitalization

"The roads of this 25 per cent group are generally considered to be weak roads. I point out, however, that as a class their weakness is accounted for solely by their faulty capitalization and is not occasioned by disadvantage of location or operating conditions. Of course it is understood that there are certain variations as between individual roads in each group and that these comparisons are between the groups as such. I do not hesitate to say that if roads of the 60 per cent group were capitalized as are the roads of the 25 per cent group they would be classified as weak

roads, and conversely, roads of the 25 per cent group capitalized as are the strong roads would be called strong.

"I conclude therefore that rates which produce a fair return upon property value will maintain the credit of the 60 per cent group of roads and will thus enable them to furnish adequate service, while the same rates, though producing a similar income and a similar rate of return upon property value for roads in the 25 per cent group will not establish their credit and thus will not enable them to furnish adequate service. I conclude further that one of the major problems to be solved in the process of consolidation is to bring about such capital reorganizations as shall make capitalization consistent with property value. A second major problem is the distribution among the stronger systems of the 15 per cent group of roads which are unable to derive from rates adequate for roads as a whole an income which will enable them to furnish adequate service.

"So long as the units of our transportation system are so greatly lacking in uniformity as is indicated by the above, it is obvious that uniform results cannot be attained under the Transportation Act, or in fact under any system of regulation which can be devised. Unless railroad units of more uniform character can be created through the process of consolidation any system of public regulation will fail, and where public regulation fails the continuation of private ownership will become impossible.

Competition

"The Transportation Act specifically provides that in planning for these new railroad systems existing routes and channels of trade and commerce should be preserved where practicable and competition shall be maintained as fully as possible. My conclusion is that this first condition is a requirement that existing systems, whether they exist as a result of mergers, leases, stock controls or other forms of ownership are to be dismembered only sparingly, since if such existing systems were to be allocated in part to one new system and in part to another, a considerable change in traffic movements would be inevitable.

"The subject of competition requires a somewhat more extended discussion inasmuch as the conception of the meaning of the act relating to it has an important bearing upon the character of the grouping of roads to be adopted.

"Since the fundamental purpose of the Transportation Act is to provide transportation at the lowest costs consistent with adequate service it is clear that the competitive service which is to be preserved is such as will promote economy of operation and efficiency of service. The mandate to preserve competitive service, therefore, is also a mandate to eliminate any and all competitive service which through a duplication of facilities, or otherwise, will tend to increase the cost of service or hinder its efficiency.

"It is not only unnecessary to make any attempt to preserve wasteful competition; the possibility of eliminating any wasteful competition becomes an argument in favor of any proposed consolidation. It seems to me to be unsound to hold as it has been held in some cases in the tentative plan published by the commission that some consolidations which might be made with advantage to the public from the point of view of economy and efficiency can not be considered because such consolidations would require the merging of roads which are parallel to each other and because such consolidations would violate the provisions of the act relating to the preservation of competition. As I interpret the Transportation Act the preservation of competitive service is made subordinate to its more fundamental and important requirement for adequate service at a minimum cost. But even if consolidations are planned for in accordance with the principle just stated, I am convinced that the competitive factor will still be present to protect the public interest.

"The policy of rate making established by the Transportation Act is that rates are to be made with a view to the combined requirements of groups of roads and without regard to the particular requirement of any single road in the group; the total product of the rates is designed to be neither more nor less than the amount which will satisfy the combined requirements of all. The consolidation process is intended to create in a given territory a few railroad system so organized and so circumstanced that all will have equal opportunity to secure from this rate fund, which as a whole is designed to be sufficient for all, the income which each needs. Under such circumstances it is obvious that each system will be in the keenest kind of competition with all other systems in the rate group, in competition to secure its needed income from a total rate fund which is adequate for all but which is, nevertheless, limited in amount. The success of any railroad in this competitive struggle will depend solely upon the quality of the service which it offers and upon its ability to practise economical and efficient operation and management in providing such service. Competition of this kind will furnish the incentive for each system to supply the best possible service, for failure to do so will deprive it of income upon which its financial success depends. Thus it seems clear to me that the benefits to the public resulting from the competitive struggle of the new consolidated systems may be expected to be greater than it has heretofore received from the competitive service which has existed.

"I therefore conclude that the mandate to preserve competition is not a mandate to preserve any wasteful competition but rather to eliminate it; that the struggle of railroad systems of equal possibilities to secure each its needed income through the practice of economy and efficiency is the competition which is to be made possible,—a competition which will afford a maximum of advantage to the public. The sole object of its policy of competitive service as distinguished from monopolistic service is to assure such advantage to the public.

"The foregoing is a statement of the principles which must be observed if private ownership under public regulation is to be successful and an analysis intended to show that these principles cannot be observed and applied to our transportation system as it exists today. Furthermore it is an attempt to indicate the character of railroad systems to which these principles may be applied with success.

"To summarize these, the problem of consolidations as I understand it, is to group all of the existing railroads of each major section of the country into a few systems of such uniform character that they can compete on equal terms and be equally successful in obtaining a return upon their respective property value, and so similarly capitalized in accordance with sound and proven standards that the similar return upon property value will be equally effective to assure credit; and furthermore that this grouping is to be accomplished so as to preserve, so far as possible, not only such traffic relationships as have been created by a common ownership of properties but also such as have existed between properties of diverse ownership."

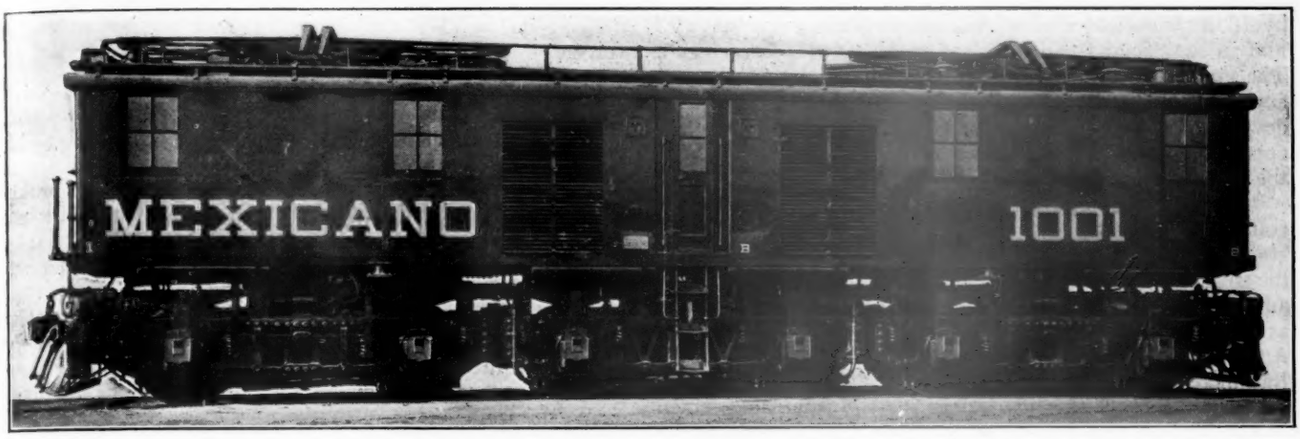
Mr. Oldham also discussed some modifications of the plan he had suggested in 1921. In conclusion he added:

"A question has also been raised as to the meaning of the term 'consolidation' as used in the act. If the commission shall conclude that its plan of consolidation must be restricted to groupings accomplished through the actual merger of properties, and that it is not free to make use of leases, stock controls or other devices of ownership, then it is apparent that many groupings which would be desirable from every point of view would be prevented, and that the full purpose of the act would fail of accomplishment. The purpose of the groupings as I understand it, is to create systems of equal earning power in order that the owners of the securities of each property may secure the return to which they are entitled. It seems to me, therefore, that it is not material from this point of view whether ownership is evidenced by securities of a parent or of a subsidiary corporation. Where the purpose of the act is so clear it may be hoped that a way will be found to accomplish it even though there may be some doubt as to whether the act has in terms prescribed all forms of ownership which it may be desirable to employ."

U. S. Chamber of Commerce Report Filed

Richard Waterman, chief of the railroad bureau of the Chamber of Commerce of the United States, filed a copy of the report of the consolidation committee appointed by President Barnes of the chamber to be considered by the transportation conference soon to be held under the auspices of the chamber, which advocated railroad consolidation through the voluntary action of railroad companies without change in the consolidation provisions of the transportation act at the present time. He also gave a statement of the position of the national chamber as to railroad consolidations as expressed as the result of a referendum vote in 1919 when an overwhelming vote of the members was in support of a recommendation that "the railroads be allowed, in the public interest, when so declared and approved by public authority * * * to unite in a limited number of strong competing systems, so located that each of the principal traffic centers of the country shall, if possible, be served by more than one system."

W. H. Connell, assistant traffic manager of the Merchants' Association of New York, presented a copy of resolutions asking the commission to take no action affecting the New York terminal situation that would interfere with the comprehensive plan of the New York Port Authority. F. J. Goebel, of the Cincinnati, Indianapolis & Western, said that the property had been reorganized in 1915, and asked that it not be committed to a specific allocation. C. W. Johns, chief engineer of the Chesapeake & Ohio, submitted some rebuttal testimony.



One of the Ten Electric Locomotives being Built for the Mexican Railways

Electric Locomotives for Mexican Railway

Ten Locomotives for Both Freight and Passenger Service Will Be Completed by March 1, 1924

By Glen H. Walker
Railway Engineering Department, General Electric Company

FOR THE initial electrification of the Mexican Railway Company the General Electric Company and the American Locomotive Company are furnishing ten 150-ton, 3,000-volt direct-current electric locomotives. The tests on the first of these are now nearing completion at the Erie works of the General Electric Company.

The Mexican Railway Co., Ltd., is one of the oldest railway companies operating in Mexico. Its main line runs between Vera Cruz on the Gulf of Mexico and Mexico City. A section of this line between Orizaba (about 70 miles inland from Vera Cruz) and Esperanza, a distance of 30 miles, is now being electrified. This section is known as the Maltrata Incline and includes the most scenic country in Mexico. Mt. Orizaba, 18,225 feet in height, is visible from almost all points in this section and has snow at its peak the year around.

It is said that the construction of the Maltrata Incline of the Mexican Railway was one of the most difficult pieces of railway engineering attempted in North America. Because of the mountainous country through which the railroad passes from the sea level at Vera Cruz to the great Mexican plateau —a change in elevation of some 8,000 ft. in 100 miles— many severe grades and sharp curves are encountered. A change of 4,000 ft. in elevation is made in the 30-mile section which is now being electrified.

Service

The locomotives will be used in both freight and passenger service between Orizaba and Esperanza. Freight trains of 700 tons weight will be taken up the grade with two locomotives, one at the head end and one at the rear of the train. Trains of about the same weight will be brought down the grade with one locomotive by regenerative electric braking. Speeds both up and down grades for freight trains will average about 15 miles per hour.

All but an occasional passenger train can be taken over the grades by a single locomotive. For passenger trains requiring more than one locomotive two units will be used operating at the head end under the control of one engineman. As it is considered unsafe to run trains down these grades and around the sharp curves at greater than 20 m. p. hr. the same locomotive with the same gear ratio as that used for freight service will be used for passenger service. The speeds of the passenger trains will average about 18 to 20 m. p. hr. both up and down grades, although the locomotives can operate at a maximum speed of 33 m. p. hr.

The locomotives are rated 04440-E-308-6GE278A-3000 volts direct-current, having characteristics and dimensions as listed in the table.

GENERAL DATA

Electrical Data	
Nominal voltage of system	3,000 volts, d. c.
Tractive effort 1 hour blown (3,000 V.)	54,300 lb.
Speed at 1 hour rating	20 m. p. hr.
Total horsepower, 1 hour	2,700
Tractive effort continuous 3,000 V	46,200
Speed at continuous rating, 3,000 V	20.5
Total horsepower, continuous	2,500
Number of motors	6
Type of motors	GE-278-A-1,500/3,000 V
Gear ratio	90/18–5.00
Tractive effort at 30 per cent tractive coef	92,400 lb.
Mechanical Data	
Track gage	4 ft. 8½ in.
Wheel arrangement	04440
Diameter of drivers	46 inches
Number of driving axles	6
Total wheel-base	40 ft. 6 in.
Max. rigid wheel-base	9 ft. 2 in.
Width overall	10 ft. 1½ in.
Height over trolley locked down	15 ft. 2 in.
Length inside knuckles	52 ft. 11 in.
Weights	
Total weight on drivers	308,000 lb.
Weight per driving axle	51,300 lb.
Dead weight per axle	12,150 lb.
Elec. and air brake equipment	135,000 lb.
Mechanical equipment	173,000 lb.

Mechanical Features

A single cab is mounted on two equalizer frames which in turn are carried upon three two-axle articulated trucks. A motor is geared direct to each axle with twin spring gears.

The cab is of the box type, built up of ⅛ in. steel sheet, riveted to structural framework, on a platform of structural steel longitudinal and cross sills, stiffened by bolster bars and a ⅜ in. steel floor plate. The cab is 47 ft. 6 in. long

by 10 ft. wide and divided into an apparatus compartment and an engineman's cab 5 ft. long by 10 ft. wide at each end. The apparatus compartment houses the high tension control apparatus and the auxiliary machinery. Doors and windows are located to provide light and access to the cabs and apparatus compartment. Louvers are located on each side of the side doors to admit air to the cab for the blowers.

The three trucks have steel side frames to which the end frames carrying the draft gear and articulated joints are bolted. The superstructure is carried on center plates on the truck transom bolted to the side frames at their mid-point and the whole is carried on equalized semi-elliptic springs as has been satisfactorily used on locomotives for the Butte Anaconda & Pacific, the Chicago, Milwaukee & St. Paul, the Baltimore & Ohio and others. Buffing and hauling stresses are carried through the side frames and the articulated joints.

The leading and trailing trucks are equipped with Miner Friction A-18 draft gear and Simplex couplers with 5 in. x 7 in. shank, 9⅛ in. butt, and 9 in. solid knuckle. The couplers are located 34½ in. above the rail head.

Motors

To each of the six axles there is geared a box frame, twin geared, commutating pole, GE-278-A-1500/3000-volt, railway type motor with forced ventilation. These motors are designed to operate two in series on 3,000 volts or with 1,500 volts per motor, but each is insulated for 3,000 volts to ground. Each motor is supported on its axle by suspension bearings and on the transom by a spring nose support giving a clearance under the gear case with new wheels and axle linings of 4¼ in. An 18-tooth forged steel pinion is mounted on each end of the armature shaft which meshes with a 90-tooth cushion type gear on the axle. The cushion type gear is designed to permit a small movement of the rim about the gear center which tends to equalize the stresses in the gears and pinions and to minimize the shocks on the teeth.

Auxiliary Machinery

The auxiliary machinery consists of a 3,000/1,500 volt dynamotor which has a 4 kw., 65-volt control generator mounted on a shaft extension, a 1,500-volt regenerative exciter set, two 1,500/3,000-volt motor-driven blowers and two 1,500/3,000-volt air compressors. The dynamotor provides 1,500-volt power for operation of the blowers, compressors, and the regenerative exciter set. The two blower motors and the two compressors will normally be operated in series across 3,000 volts with their mid-points connected to the mid-point of the dynamotor for equalization. The regenerative exciter will be operated from the 1,500 volt point on the dynamotor to ground. If it is not required to operate the blowers at their maximum capacity, they may be connected in series and operated from the 1,500-volt dynamotor bus to ground.

The control generator mounted on the dynamotor shaft extension furnishes current at 65 volts for lights, headlights, foot warmers, control circuits and for charging the storage battery.

The two air compressors are of the two-stage horizontal cylinder type and have a total piston displacement of 150 cubic feet per minute when delivering air against 130 lb. pressure and operating two in series on 3,000 volts.

The scheme of auxiliaries outlined above was chosen for this locomotive as it provides means of operating one compressor or one blower from the 1,500-volt dynamotor bus in case of failure of the other machine. It also provides means of operating the compressors and blowers in case of failure of the dynamotor which could not be done if low voltage auxiliaries were operated from a 3,000-volt motor-generator set. A further advantage is in the fact that a dynamotor is inherently a stable machine and not subject to flashing due to short circuits and sudden changes in trolley voltage.

Air Brake

The air brake is Westinghouse No. 14 EL, double end, straight and automatic equipment including air signals. This equipment is arranged for double-heading locomotives and provision is made to prevent application of the air brakes on the locomotives during regenerative braking while the brakes may be applied on the train. This feature enables a single locomotive to bring a much heavier train down grade under the control of regenerative braking and air brakes than could be brought down under the control of regenerative braking alone. In case of an emergency application of the air brakes during regenerative braking, regeneration is automatically shut off allowing the air brakes on the locomotive to apply in the usual manner.

Control

The locomotives are equipped with type P. C. L. electro-pneumatic control for non-automatic, multiple-unit operation. A master controller is located in each engineman's cab at each end of the locomotive and arranged to give 15 accelerating steps, one full field running step and two reduced field running steps with six motors in series in one group, nine accelerating steps, one full field running step and two reduced field running steps with three motors in series in two parallel groups, and seven accelerating steps, one full field running step and two reduced field running steps with two motors in series in three groups in parallel. This gives a total of nine running points which for a given tractive effort of 50,000 lb. and 2,700 volts line correspond to speeds of approximately 5, 4, 6.0, 6.75, 11.4, 12.8, 14.2, 17.4, 19.6 and 21.6 miles per hour.

Regenerative braking on the down grades is accomplished by exciting the fields of the traction motors by the regenerative exciter. Fifteen regenerating steps are provided for on the master controllers for each of the three motor groupings. These permit continuous regeneration at values of speed and braking effort within the safe operating limits of the motors.

The main motor circuits are protected by a quick-acting circuit breaker placed in the main circuits ahead of all accelerating contactors, etc. This breaker serves as a line breaker as well as to give overload and short circuit protection. On overloads it trips out due to the action of overload relays and on short circuit it opens on a sudden rise in the value of the current flowing through it.

The auxiliary apparatus is controlled by electro-magnetically operated contactors which are operated by push-button switches within reach of the engineman at either operating position.

Current is collected from a centrally located overhead conductor through one or both of two slider pantograph trolleys located on the roof of the locomotive one at each end. These trolleys have a range of from 15 ft. 5 in. to 24 ft. above the rail. They are raised and held against the wire by air pressure and are retracted by gravity when the air pressure is released. Air is admitted to or exhausted from the trolley cylinders by a magnet valve which is operated by a push-button switch at the operating position. The engineman can raise or lower either or both trolleys by these switches at either position.

The locomotives are equipped with air-operated whistles, bell ringers and sanders which are controlled by valves at the engineman's position. Ammeters, a voltmeter and a speed indicator, as well as the usual air gages, are mounted on panels within the engineman's view.

Arrangement of Apparatus

The apparatus compartment is divided up into a rheostat compartment and two control apparatus compartments.

The rheostat compartment extends each way from the center of the cab about one-half the length of the apparatus compartment and is approximately three feet high. Near each end a ventilating flue extends from this compartment to ventilators on the roof which serve to carry off the heat generated by the rheostats.

The roof of the rheostat compartment is insulated against heat and used as a shelf upon which the auxiliaries are mounted and conduits are run carrying cables between the control compartments and from the control compartments to the taps on the rheostats. The latter cables are carried from the conduits through the roof of the rheostat compartment in porcelain bus lugs.

The location of the auxiliaries in the middle and on top of the rheostat compartment makes them very easily inspected from the side aisles and keeps the noises of the running machines out of the engineman's cab.

The control apparatus compartment on No. 1 end contains the main switch, quick-acting circuit breaker, lightning arrester, other protective apparatus and some of the accelerating contactors. These pieces of apparatus are located so that there is a center aisle in the compartment giving very good access to the apparatus. This aisle is entered from the engineman's cab and is on the same level.

The control apparatus compartment on No. 2 end is similar in arrangement to that on No. 1 end and contains the cam switches for grouping the motors for the different motoring and regenerating combinations, the reverser, the motor cut-out switches and the remainder of the accelerating and field-reducing contactors.

The high voltage connections to the apparatus in both compartments are made at the back and are accessible by removing compartment covers into the side aisles. The low voltage control connections are made at the front of the apparatus and the wires are carried in a control trough running in front of the apparatus.

The American Locomotive Company has completed shipment of the 10 mechanical portions of these locomotives from their Schenectady plant. The installation of equipment and tests are being made at the Erie, Pa., plant of the General Electric Company and it is expected that five complete locomotives will have been routed to the Mexican Railway Company at Orizaba by the first of the year. The remaining five locomotives will be completed before the first of March so that electric operation may be started early in the spring of 1923.

The Insulation of Refrigerator Cars*

The Economical Thickness of Materials, Considering Investment, Icing and Transportation Costs

By Prof. A. J. Wood† and Phillip X. Rice‡

IF THE TREND in the present development is an indication, the refrigerator car of yesterday will not be the refrigerator car of tomorrow. The steam locomotive has passed through a similar transition; when wages, fuel costs and operating expenses were low, there was no great incentive to obtain the greatest economy and highest efficiency. In somewhat the same way when the prices of perishable food products were low and the supply abundant, the question of accurately accounting for the heat losses in refrigerator cars or of the spoilage of some of the products, was not a matter of very serious concern. Not so today. The higher cost and greater demand have resulted in the analysis of costs which heretofore were regarded as unimportant.

The study of the authors indicates that nearly all of the refrigerator cars in the United States are insufficiently insulated.

The saving of perishable food and the reduction of the amount of ice required for that purpose, must be balanced against the various factors to accomplish this saving. Among many items which the authors consider are the percentage of time that cars are in service, cost of transporting extra weight of insulation, depreciation of the cars, required amount of insulation for a particular structural design, effect of radiation, and the relative amount of absorption of heat due to different colors of paint. These and other factors must all be co-ordinated and the solution made simple and direct.

The Factors

The following factors enter into the determination of the economic thickness of insulation of a refrigerator car:

INVESTMENT

Fixed charges due to ownership of insulation.

(a)—Thickness of insulation.

(b)—Price per board foot of insulation.

(c)—Fixed charge, per cent, including interest, taxes, maintenance and depreciation.

COST OF REFRIGERATION OR HEATING

(d)—Conductivity and economic thickness of the material whose economical thickness is to be determined.

(e)—Conductivity and thickness of other parts of structure, such as structural wood, etc.

(f)—Resistance of air spaces and surface resistance.

(g)—Difference between the temperatures of the air on the two sides.

(h)—Percentage of year in which the refrigerant or heat is employed.

(i)—Price of ice, refrigerant, or heat delivered to room to be insulated.

TRANSPORTATION

For railroad-owned refrigerator cars, a transportation charge is to be included.

(j)—Thickness of insulation.

(k)—Density of insulation.

(l)—Miles per year.

(m)—Cost of transporting extra weight of insulation.

[The authors here presented a method of applying the various factors entering into the determination of the economic thickness of refrigerator car insulation to the solution of specific problems, using logarithmic alignment charts. Following is a general discussion of these factors.—Ed.]

Economic Curves and Results

Having thus calculated all the charges for various thicknesses of various insulating materials, economic curves simi-

*This is an abstract of a paper which will be presented at the annual meeting of the American Society of Mechanical Engineers, to be held at New York, December 3 to 6, 1923.

†Mr. Wood is Professor of Mechanical Engineering at Pennsylvania State College, State College, Pa.

‡Mr. Rice is now Electrical Engineer of the Miller Train Control Corporation, Danville, Ill.

lar to Fig. 1 can be plotted for floors under prescribed conditions of operation. Other curves can be drawn for ceilings with their own peculiar conditions. Fig. 2 shows three economic curves for ceilings and floors of refrigerator cars engaged in general perishable-fruit business, the data for plotting the curves being taken from Tables I, II and III. The condition under which standard fruit cars operate in average transcontinental trips from April to September is shown in the notes under the tables.

A comparison of the curves in Fig. 1 reveals the economic superiority of regranulated cork for floors. The curves

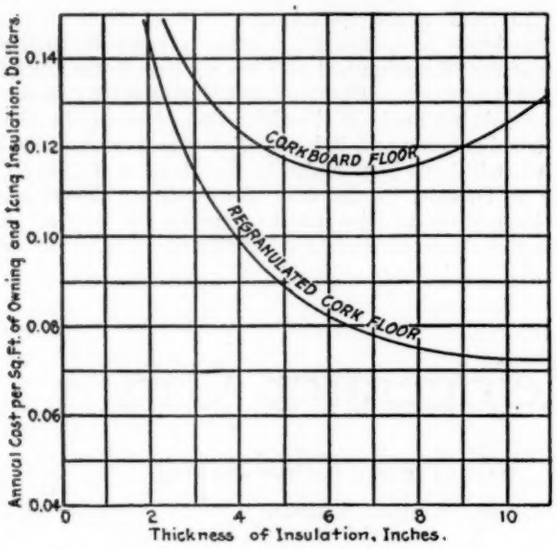


Fig. 1—Insulation Economics for Meat Cars—Based on 35 Deg. F. Temperature Difference; 3.3 in. of Dry Wood in the Floor; No Charge for Transportation of Insulation; 11 Per Cent Salt Used with Ice

show that the minimum annual cost per square foot of corkboard is $0.114, whereas with regranulated cork the minimum is $0.072. The respective economic thicknesses are seen to be 6.5 in. and 10.5 in. If the structural wood was considered to be wet, and this is the safe assumption, the relative advantage of regranulated cork as compared with

TABLE I—ECONOMICS OF TRANSCONTINENTAL FRUIT CARS—HAIR FELT CEILINGS

	Thickness in inches					
	1	2	3	4	5	6
Interest	0.009	0.018	0.027	0.036	0.045	0.054
Ice	0.067	0.047	0.038	0.031	0.026	0.023
Transportation	0.015	0.031	0.045	0.063	0.079	0.095
Total	0.091	0.096	0.110	0.130	0.150	0.172

Based on service from April to September, inclusive. Average shade temperature, 64 degrees Fahr.; fair-weather factor, 70 per cent; average increment on roof, 8.2 degrees × 70 per cent = 6 degrees; average total roof temperature, 64 + 6. = 70 degrees; average ceiling temperature (2 in. below), 50 degrees; structural wood in ceiling (2:5 in.), dry; air spaces in ceiling, 2 in.

corkboard would be even greater. If steel floors were used instead of wood, regranulated cork would also show a greater economic advantage.

Fig. 2 shows that even for the same material the economic thickness may be much more for floors than for ceilings. Probably the economic thickness for side insulation would be different from roofs or floors because the average temperature difference in the side is different from other parts of the car and the structural wood and number of air spaces may be different. The curve for hair felt appears to be a minimum at 1 in., but in practice such a thin ceiling should not be used in the car because of the greater tendency for the top layers of fruit to spoil. The economical thickness of ceiling insulation for overhead refrigerating systems, such as the A. B. C., Moore, or the side-draft bunker system,§ would be considerably greater than the thicknesses shown in Fig. 2, because of the superior refrigeration in the upper part of the car.

A comparison between the curves of Figs. 1 and 2 indicates a great difference in economic thickness. This is due to the colder inside temperatures of the meat car and to the fact that meat packers do not have to pay for transportation of extra weight of insulation. With the present system of car interchange, the cost of transporting the extra weight of a thoroughly insulated car is not assessed against the car owner, even if the owner is a railroad company. If only one road should adopt thicker insulation, the other railroads, over whose lines the car operates, would unwittingly bear the extra cost of transporting extra insulation. Naturally, this loss would come out of what would perhaps otherwise be profit for the roads handling the car. Therefore, as in-

TABLE II—ECONOMICS OF TRANSCONTINENTAL FRUIT CARS—REGRANULATED CORK CEILINGS

Footnote to Table I applies also to this table

	Thickness in inches					
	1	2	3	4	5	6
Interest	0.003	0.006	0.009	0.011	0.014	0.017
Ice	0.070	0.051	0.040	0.033	0.029	0.025
Transportation	0.008	0.015	0.022	0.029	0.036	0.044
Total	0.081	0.072	0.071	0.073	0.079	0.086

terchange customs now stand, the economical thickness of insulation should be calculated with practically no transportation charge. To be exact, of the car's annual mileage of, say, 20,000, the owner of the car may haul it only 3,000 or 5,000 miles, and the transportation factor should be reduced accordingly. Small roads owning refrigerator cars would therefore insulate them more thoroughly than would long roads. In fact, the short road might well neglect the transportation cost of thick insulation and use insulation much thicker than is now commonly employed. Furthermore real thick insulation would reduce spoilage claims somewhat and obviate much criticism from shippers.

Air-Space Construction

Cellular paper insulation has possibilities in connection with the economics of refrigerator cars, principally because of its light weight. The natural criticism to such a sugges-

TABLE III—ECONOMICS OF TRANSCONTINENTAL FRUIT CARS—REGRANULATED CORK FLOORS

	Thickness in inches					
	2	3	4	5	6	7
Interest	0.006	0.009	0.011	0.014	0.017	0.020
Ice	0.100	0.071	0.060	0.047	0.042	0.037
Transportation	0.015	0.022	0.029	0.036	0.044	0.051
Total	0.121	0.102	0.100	0.097	0.103	0.108

Based on service from April to September, inclusive. Average shade temperature, 64 degrees Fahr.; average increment under floor, 3 degrees; average total floor temperature, 67 degrees; average temperature 2 in. above floor, 37 degrees; temperature difference, 30 degrees; structural wood (3⅜ in.), dry.

tion is that paper insulation would disintegrate in the presence of the inevitable moisture that accompanies refrigeration. The authors do not know of any tests on such material, except those made at State College on a piece of paper insulation one foot square and one inch thick, with one edge nailed to an improvised flag mast. This insulation has withstood the rain, snow, sun, and gales for one year, and apparently would still function as refrigerator-car insulation. It was constructed of hard glazed wrapping paper, coated on both sides with shellac to fasten together the corrugated sheets and to waterproof the paper. Half-inch corrugations were put between flat sheets of paper, and two of such series constituted the one inch thickness. The authors also constructed paper insulation three feet square and two inches thick in a similar arrangement. This weighs only

§See Railway Mechanical Engineer, June, 1923, Tests on a Refrigerator Car Model by P. X. Rice.

one-eighth as much as hair felt of equal thickness or one-quarter as much as hair felt of equivalent thermal resistance.

Objection has been made to air-space construction on account of the uncertainty of the air spaces remaining securely sealed. Apparently no dependable quantitative data on air leakage in air spaces are available, but information from a number of engineers who have examined the conditions after cars have been in service, leads the authors to believe that

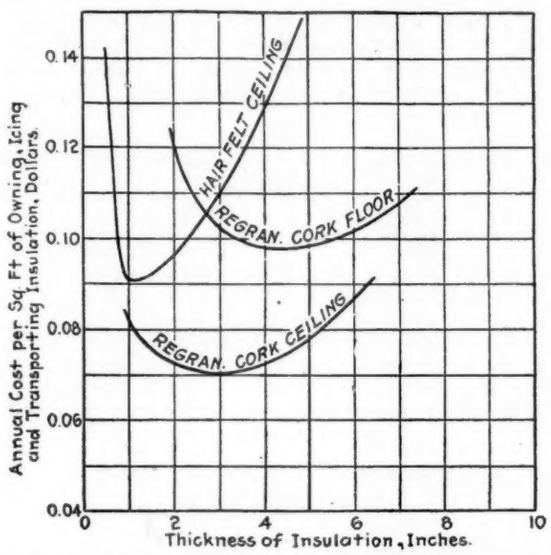


Fig. 2—Insulation Economics for Transcontinental Fruit Cars

in most cases air spaces are maintained for a long time without any serious change. The "heat meters" which are being developed independently by the Engineering Experiment Station and by the Research Laboratory of the American Society of Heating and Ventilating Engineers, may be used to measure directly the effectiveness of old and new cars of various constructions. Until satisfactory tests are made to settle the difference of opinion on the question of air leakage,

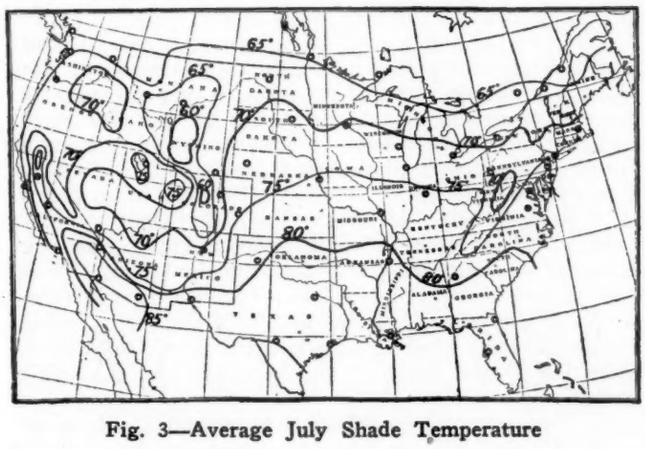


Fig. 3—Average July Shade Temperature

the authors will continue to believe that there are undeveloped possibilities in air-space construction.

Discussion of Factors Involved

There are not many factors involved other than those named which affect the choice of insulation. Moreover, most of those listed are subject to variation in characteristics difficult to evaluate. Further consideration may be given to the factors mentioned early in the article and these will be taken up in the order as listed.

(*a*)—Thickness of insulation may not conform to exact specified thickness. This is particularly true of hair felt.

(*b*)—Price per *actual* board foot may not conform to *quoted* price on account of discrepancy in thickness.

(*c*)—Fixed charge in per cent, includes maintenance and depreciation which change with successive improvements in construction and operation, and is somewhat difficult to determine accurately for any particular installation.

(*d*)—The conductivities of most of the insulating materials have been determined for certain conditions, but unless the engineer knows something of the properties and characteristics of materials and the conditions under which they were tested, he may be misled in using tabular values.

The conductivity of a given piece of insulation is almost certain to lose some of its thermal resistance in service. During the process of installation the material may be crushed or stretched or fail to fit closely enough to prevent convection through the wall or part of the wall. In service, the wall insulation may become detached in places and break the continuity of the material. From an inspection of hundreds of cars the authors concluded that usually car floors and the lower part of walls are soaked with water. Superintendents of refrigerator service admit that floors and lower walls are the least satisfactory. Unless steel floors are used, it would be safer to assume that the floor insulation will be wet and the conductivity should be chosen accordingly. In the case of yellow pine, the authors found that the conductivity of wet wood was about twice as much as that of dry wood. With insulating materials the variations due to moisture content

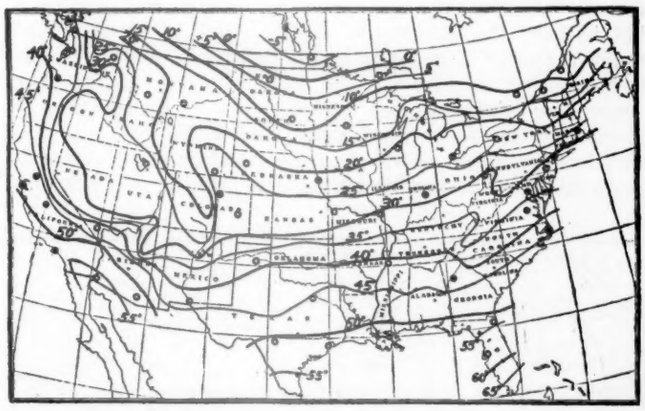


Fig. 4—Average January Shade Temperature

are not known and the true values cannot be used until some laboratory has determined the effect of moisture. For imperfectly protected floor insulation the authors suggest that conductivity be doubled for economic calculations. A certain railroad built two milk cars with watertight, rust-resisting steel floors; probably the reduced maintenance cost would justify such construction independently of the considerable saving in ice.

(*e*)—In general, the conductivities of other structural parts of a car cannot be determined accurately, but ordinarily the thermal resistance of such parts is such a small part of the entire wall or floor that some tolerance of conductivity is permissible. As mentioned before, the thermal resistance of wood depends largely on its moisture content and probably, for unprotected floors, should be taken as half the resistance of dry wood. Other structural materials often have less insulation value than is shown in tables for conductivity.

(*f*)—Resistance of an air space is difficult to predict unless it is known to be strictly airtight. For stationary cold-storage walls, ordinary cracks would not be as objectionable as in moving cars. It has not been determined how tight an air space must be in order to be effective. Surface re-

sistance is such a variable that the safe procedure is to use a value of zero for the outside surface of cars when the air passes over the surface at a speed of more than 10 miles an hour. If the resistance of the car wall proper is relatively high, as in modern refrigerator cars, the outside surface resistance can be neglected with but slight error in the total transmission through the wall. It is better to use some approximation of the outside surface resistance, taking into account the velocity of air on the surface. The inside surface resistance amounts to more than that of the outside, and ordinarily where the air is fairly calm, the surface resistance can be predicted closely enough for thick walls where an error in the surface resistance would not affect seriously the total transmission.*

(*g*)—Differences of temperature between the outside and the inside of the car should be determined by actual measurements; if that is not possible, it can be approximated by aid of recorded tests of similar cars, provided it is known where the temperatures have been observed. The following may assist in this approximation: The floors of end-bunker cars are often 20 deg. to 35 deg. F. colder than the ceiling. It is desirable to use the temperatures taken at least two inches from the car surface and to include surface resistances in the calculations.

Outside shade temperatures can be predetermined approximately by the temperature maps, Figs. 3, 4 and 5, which show July, January, and annual shade temperatures. These apply to outside wall and floor temperatures, but are somewhat too low because the walls receive direct radiation from the sun on bright days and floors receive some radiation from hot ballast. In the case of roofs, especially black or red roofs, the error of neglecting radiant heat is appreciable, as is brought out in Fig. 6. The authors have found at noon, summer or winter, at any latitude, there is a difference of about 62 deg. F. between shade and either black or red roof temperatures,† provided the sky is clear and the roof is perpendicular to the sun's rays. If the roof is in a horizontal position, the variation in temperature increment above shade temperature is shown in Fig. 6 by the broken lines for August, October, and December. For an integrated average covering a period of 24 hours' fair weather, the increments obtained are 20.4 deg. F. in August and 17.5 deg. F. in October, or 17 deg. F. annual. The corresponding increments for white roofs are only 7.6 deg. F., 5.6 deg. F., and 5.5 deg. F. It can be seen that if the railroads would paint their car roofs white, as some paint the walls, considerably less ice would be required. However, the 20.4-deg. average for August for black roofs applies only for still air in clear weather. Refrigerator cars stand still only about 40 per cent of the time they carry ice, and much of the other 60 per cent they run at speeds above 10 m.p.h., above which speed the temperature increment is negligible. Furthermore the natural wind velocity is often greater than 10 m.p.h., so that one should not expect to experience more than 40 per cent of 20 deg., or 8.2 deg. average effective increment. For stationary cold-storage buildings the effective increment in August would probably be 15 deg. to 18 deg.

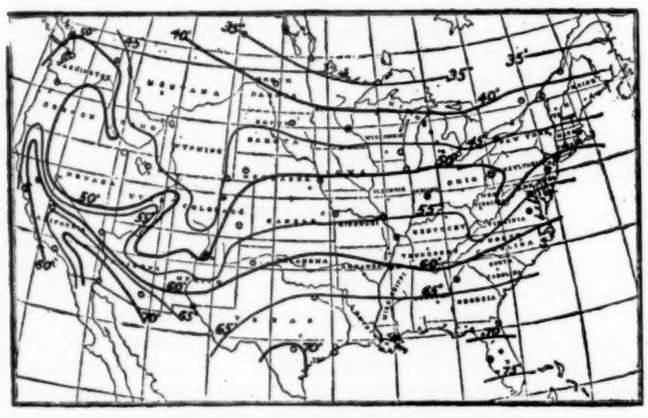


Fig. 5—Average January Shade Temperature

By aid of the diagrams of Figs. 3 to 6, inclusive, one is able to reach fairly accurate results for outside average-temperature conditions in different parts of the country and for different conditions under which the sun strikes the surface. The inside temperatures may be approximated as indicated, making it possible to determine with reasonable accuracy the average temperature differences.

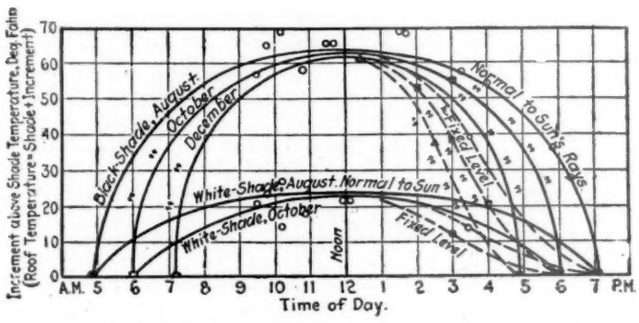


Fig. 6—Roof-Temperature Corrections, Increment Above Shade Temperature

(*h*)—The correct figure for the percentage of year in which a refrigerant or a heater is used should be determined on the car-day basis; that is, if only a few cars are refrigerated in winter and all the cars are refrigerated for three months in summer, the figure would be slightly over $3/12 =$ 25 per cent. This is sufficiently close for ordinary refrigerator-car service, but for special industries, such as meat packing, the figure may be 30 per cent. In the case of cold storage the figure is generally much higher.

(*i*)—The price of ice for refrigerator cars can be found readily by referring to the regular charges made at icing stations, ordinarily about $4 per ton. In cold-storage plants the cost of producing and delivering refrigeration to the storage rooms can be determined most accurately by referring to the construction, maintenance, and operating costs of the plant; probably the cost is less than $1 per ton of ice (equivalent refrigeration). It may be noted that the cost of absorbing heat by refrigeration or by ice is many times more expensive than supplying that much heat by heaters. Therefore the cost of supplying heat to refrigerator cars in winter is almost negligible in comparison with the cost of refrigerating the same cars in summer; the economic thickness of insulation should therefore be determined by the refrigeration.

(*j*)—See comment on thickness in paragraph (*a*) above.

(*k*), (*l*), (*m*)—These have been covered by the discussion in previous paragraphs.

It should be apparent to those who have followed the discussion, that the most intricate problems of economic thickness of insulation may lend themselves to a satisfactory solution if full information is obtained concerning the factors involved.

*This is further discussed in an article by A. J. Wood on Insulation of Passenger and Refrigerator Cars, in Railway Mechanical Engineer, September, 1921.

†This value of temperature increment is approximate, being the average of many readings of mercury thermometers.

LUMBER EXPORTS from British Columbia this year are heavier than ever before, and the total quantity scaled in British Columbia up to the end of August was about 1,500 million feet, equal to 50 per cent above the record of the corresponding months of 1922.

General News Department

The Pathé News films are this week showing pictures of the Denver & Rio Grande Western's Mallet locomotive No. 3507, which is described as "72 men long and 3 men high."

The Pere Marquette has extended its group insurance plan entered into with the Equitable Life Insurance Society on July 1, 1922, to cover all employees of the mechanical department. The employees will pay one-half of the premium and the company will pay the balance.

More than 125 millions is the latest estimate by officers of the Southern Pacific of the total amount of the blanket life-insurance policy which the company has contracted for to be maintained for the benefit of the employees of its railroad lines and numerous affiliated business enterprises. The humble Mexican track laborer, when he learns that his wife is the potential beneficiary of a $500 insurance policy which has cost him nothing, is very much surprised; he is said to have been speechless with astonishment.

One hundred representatives of the traffic and operating departments of the Grand Trunk and the Canadian National met at Battle Creek, Mich., on November 21 to discuss transportation problems. At the conclusion of the meeting, J. D. McDonald, formerly general passenger agent at Chicago, who retired from active service several months ago, after fifty-five years of connection with the Grand Trunk, was presented with a hall clock by his associates. The officers present included those from all parts of the United States and Canada who had been associated with Mr. McDonald during his long connection with the traffic department of the Grand Trunk.

The Railroad Labor Board announces that notice has been received from the New York Central and from the road's shopmen withdrawing from the Board their controversy as to wages; indicating that an agreement has been reached between the company and its employees for the use of the piecework system of payment. The classes of workers affected are the machinists, boilermakers, blacksmiths, sheet metal workers, electrical workers, carmen, helpers and apprentices and car cleaners. It is understood that for the present the piece-work system will not apply to wrecking service, road service, power house employees, millwright gangs, or car inspecting and repairing in train yards. Piece-work prices are to be increased or reduced corresponding with changes in the hourly rates.

The pensioners of the Canadian Pacific Railway, now numbering 1,182, receive an average pension of $35.92 a month. Each pension includes a bonus, which has been allowed monthly, since May 1, 1919, on account of the abnormal increase in the cost of living. For 20 months, this bonus was 25 per cent, but since the beginning of this year, it has been 20 per cent. These and other facts about the pensioners have been given out in connection with an account of the twentieth anniversary of the establishment of the pension system. Employees of the company now number about 90,000, more than four times as many as were in the service in 1903, and the total payments by the company now amount to more than $500,000 a year. President E. W. Beatty, reviewing the 20 years' history, speaks of the pension as an inherent right of employees who have given faithful service to the company, and he classes this beneficial arrangement as an important aid in shaping the high standard of cooperation that exists between all branches of the company's service.

New Labor Bank for Tacoma

The four train service brotherhoods are making arrangements for the opening of a national bank at Tacoma, Wash., with a capitalization of $200,000. The bank is expected to be in operation within 90 days and will be run along co-operative lines similar to the other brotherhood banks in various cities.

Santa Fe Dispatchers Repudiate Union

The train dispatchers on the Atchison, Topeka & Santa Fe, having taken a vote to select their system representative, have chosen A. G. Wells, vice-president of the road, in charge of operation. He was named official spokesman by a large majority. The authority of the American Train Dispatchers' Association to represent the dispatchers on the Santa Fe was thus revoked, the men indicating their desire, as subordinate officers, to deal directly with their superiors.

Slack Work in Railroad Shops

The Pennsylvania Railroad furloughed several thousand shopmen on November 26; and according to newspaper accounts, this general suspension of work will continue until December 3. A memorandum was issued by the company stating that the readjustment of forces was coincident with the usual normal slackening of freight traffic at this season and that the company's supply of serviceable freight cars and locomotives was now ample for all needs.

The Baltimore & Ohio on November 26 closed its principal shops for one week, laying off several thousand men.

The New York, New Haven & Hartford has laid off about 1,000 shopmen, furloughs being ordered at Readville, New Haven, East Hartford, Providence, Norwood and Van Nest.

C. & E. I. Complies With Train Control Order

The Chicago & Eastern Illinois has given an order to the Miller Train Control Corporation to install the Miller automatic train stop device on its road engines, not now equipped, which run on or over the territory between Dolton, Ill., and Danville, designated in the Interstate Commerce Commission's train control order. At present, 98 engines are equipped and approximately 10 engines remain to be equipped. This road has also authorized the Miller Train Control Corporation to change the present train control engine equipment to comply with the requirements of the Interstate Commerce Commission's train control order. These alterations do not affect the fundamental principles of the device or its functioning to a stop, but eliminate the permissive feature by preventing the engineman from forestalling a brake application or releasing the brakes after receiving an application before the train comes to a stop.

Chairmanship of Senate Committee in Controversy

Senator Cummins, chairman of the Senate committee on interstate commerce, and also president pro tem. of the Senate during the last session of Congress, has been made the center of a controversy as to whether for the new session of Congress he shall become president of the Senate with the salary and emoluments of the Vice-President, or retain the chairmanship of the committee. Senate leaders for a time took the position that one man should not be allowed to hold both positions and many of his friends had urged him not to relinquish the chairmanship, because if he should do so, it would go under the seniority rule to Senator La Follette. The La Follette bloc, on the other hand, has notified Senator Cummins that it would vote for him for president of the Senate if he would resign the chairmanship. It is understood that Senator Cummins has reached no definite conclusion, but that a conference of Republican leaders on Tuesday decided to support him for the

presidency of the Senate and to ask the Senate to vote on the committee chairmanship. Since the accession of Vice-President Coolidge to the Presidency, Senator Cummins has been entitled to the Vice-President's salary of $12,000 and certain other perquisites as against a salary of $7,500 as a Senator. Numerous conferences of the "progressive" bloc in Congress have been held in Washington this week for the purpose of considering their legislative program and laying plans for making their influence felt in the organization of the House and the Senate when Congress meets next week.

Labor Board Increases Wages of Telegraphers

Wage increases ranging from two to five cents an hour have been ordered for telegraphers, telephone operators, station agents, agent telegraphers, tower men, lever men, tower and train directors and block operators on 21 roads in a decision of the Railroad Labor Board of November 26. At the same time the board refused wage increases to these employees on six of the roads and reaffirmed the working rules of the Order of Railroad Telegraphers and the Brotherhood of Railroad Station Employees, the organizations representing the men, relating to the basic day, intermittent service, overtime, calls, meal periods, starting time, Sunday and holiday work, the handling of train orders, switches and switch lights, express and telegraph commissions and vacations and sick leaves. Agents at small non-telegraph stations were denied wage increases in every instance. The policy followed by the Labor Board in this case was to equalize the wages of employees of the same classification in the same territory and to take into consideration local situations in determining the disposition of local cases. The roads affected by the order of the board and the disposition of their cases are: Atchison, Topeka & Santa Fe, no increase; Atlantic Coast Line, no increase; Boston Terminal, no increase; Chicago & Western Indiana, three cents an hour; Chicago Great Western, five cents an hour; Chicago, Indianapolis & Louisville, two cents an hour; Chicago, Milwaukee & St. Paul, two cents an hour; Chicago, Rock Island & Pacific and subsidiaries, two cents an hour; Colorado & Southern, four cents an hour; Denver & Rio Grande Western and subsidiaries, no increase; Gulf Coast Lines and subsidiaries, three cents an hour; Houston Belt & Terminal, three cents an hour; Kansas City Southern and subsidiaries, two cents an hour; Lehigh Valley, three cents an hour; Maine Central and subsidiaries, no increase; Seaboard Air Line, no increase; Washington Terminal, three cents an hour; Western Pacific, two cents an hour.

Why Consolidate?

Frank H. Alfred, president of the Pere Marquette Railway, in his last public bulletin, asks the citizens of Michigan to consider seriously whether consolidation of all American railroads into a few large groups is a thing which surely will work to the advantage of the country generally. He says in part: "The proposal, which may seem plausible at first blush, is, after all, only someone's suggestion that for the moment has caught popular fancy. There is nothing absolute about it to assure general or permanent benefits to society. Many a business, considered small as compared with its national competitor, is often more efficiently managed and is able to undersell its greater industrial rival through the greater mobility of its capital, the extra effort exerted by its executives in confronting a certain situation, or again merely through the advantage of being on the ground.

"Michigan has much to lose—*and little to gain*—through the consolidation plan. Frankly, I have certain misgivings about the advantages that would accrue. Michigan's transportation system is adjusted to its local needs. It is supervised in Michigan,—not from some distant point. The vast amount of work involved in the maintenance of equipment, etc., in our shops at home, benefits our own workers. How long would such shops as the Pere Marquette maintains at Saginaw, Grand Rapids and Ionia be operated under a more or less centralized system of railroad operation? How long would the trans-Lake Michigan car ferry be continued, or if continued, how much more would it be developed? No serious-minded student of banking would suggest, for one moment, the consolidation of our banks into a national system, particularly after the experience of Canada recently with its centralized system. The simile is not far-fetched. Banks trade in money; railroads, in transportation service.

"Since then there is no positive or permanent advantage assured the shippers, the traveling public, the producers or the railroad workers, under the consolidation plan, a situation presents itself not unlike that of the Springfield lawyer's office with the rat hole in one corner, about which Lincoln wrote that 'it would bear looking into.'"

New York Railroad Club Annual Dinner

The annual dinner of the New York Railroad Club will be held at the Commodore Hotel, New York City, on next Thursday evening, December 6. It will break all records for a gathering of this kind for railway and railway supply men. The latest advice when this item was prepared on Wednesday of this week, or a full week in advance of the dinner, was that practically every available seat had been taken, including the main floor and balcony of the large ballroom at the Commodore, as well as the annexes on either side of the ballroom, or a total of between 2,600 and 2,700.

Among the guests are a number of chief executives of eastern roads, as well as prominent railway supply men and members of public utility commissions, the Railroad Labor Board, etc. Dr. William Starr Myers, Professor of Politics at Princeton University, will speak on "Thoughts on Our Present Discontent." The president of the club, F. T. Dickerson, secretary and treasurer of the Central Railroad of New Jersey, will act as toastmaster.

The tables will be removed from the main dining room at the close of the dinner and chairs will be moved in from the annexes, so that all of the guests can hear the speakers with comfort. The amplifiers will, of course, make it possible for guests seated in all parts of the room to hear clearly. Arrangements have been made with the Radio Corporation of America to broadcast the program through its station WJZ.

Railway Business Association Appointments

Alba B. Johnson, who was re-elected president of the Railway Business Association at the annual meeting in New York on November 8, has announced appointments as follows: W. H. Woodin, president of the American Car & Foundry Company, who had completed the customary service as vice-president, becomes an executive member. Replacing as executive members, Samuel M. Hastings and B. L. Winchell, who were elected vice-presidents, two new men come in—Joseph B. Terbell, New York, president of the American Brake Shoe & Foundry Company, and M. G. Truman, Chicago, president of the Marsh & Truman Company, lumber dealers. The general executive committee therefore now stands:

President—Alba B. Johnson.

Vice-Presidents—Stephen C. Mason, Pittsburgh; Charles J. Symington, New York; J. G. Platt, Boston; William E. Sharp, Chicago; S. L. Smith, Cleveland; Samuel M. Hastings, Chicago; B. L. Winchell, New York.

Executive Members—V. C. Armstrong, New York; F. N. Bard, Chicago; J. C. Bradley, Buffalo; Alexander C. Brown, Cleveland; S. P. Bush, Columbus, Ohio; Robert F. Carr, Chicago; W. E. Clow, Chicago; J. M. Davis, New York; Andrew Fletcher, New York; J. E. Galvin, Lima, Ohio; Irving T. Hartz, Chicago; A. L. Humphrey, Pittsburgh; E. J. Kearney, Milwaukee; R. P. Lamont, Chicago; Frank J. Lanahan, Pittsburgh; E. B. Leigh, Chicago; Herbert I. Lord, Detroit; A. H. Mulliken, Chicago; W. W. Salmon, Rochester, N. Y.; Alexander Turner, New York; Jos. B. Terbell, New York; E. H. Walker, New York; M. G. Truman, Chicago; H. H. Westinghouse, New York; W. W. Willits, Chicago; W. H. Woodin, New York; E. M. Zehnder, Scranton.

Treasurer—P. Harvey Middleton, Philadelphia.

The secretary, Frank W. Noxon, holds office during the pleasure of the general executive committee.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Joseph Sinkler, Pilot Packing Company, 122 South Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—L. A. Stone, C. & E. I. Ry., Chicago.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 63 E. Adams, St., Chicago.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—Grant Williams, 1341 Railway Exchange, Chicago.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 So. Michigan Ave., Chicago. Next meeting, June 3, 1924, Montreal, Canada.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothchild, Room 400, Union Station, St. Louis, Mo. Next meeting, June 18-20, 1924, Buffalo, N. Y.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamilton Ave., Chicago, Ill.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 30 Vesey St., New York, N. Y.

Division I.—Operating, J. C. Caviston, 30 Vesey St., New York, N. Y.

Freight Station Section (including former activities of American Association of Freight Agents).—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.

Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association).—J. C. Caviston, 30 Vesey St., New York, N. Y.

Safety Section.—J. C. Caviston, 30 Vesey St., New York.

Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents).—W. A. Fairbanks, 30 Vesey St., New York, N. Y.

Division II.—Transportation (including former activities of the Association of Transportation and Car Accounting Officers).—G. W. Covert, 431 South Dearborn St., Chicago, Ill.

Division III.—Traffic, J. Gottschalk, 143 Liberty St., New York.

Division IV.—Engineering, E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Next annual meeting, March 11-13, 1924, Chicago. Exhibit by National Railway Appliances Association.

Construction and Maintenance Section.—E. H. Fritch.

Electric Section.—E. H. Fritch.

Signal Section (including former activities of the Railway Signal Association).—H. S. Balliet, 30 Vesey St., New York, N. Y. Annual meeting March 13 and 14, 1924, Drake Hotel, Chicago. Next "stated meeting," Sept. 22, 1924, Ocean View Hotel, Swampscott, Mass.

Division V.—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 11-18, 1924, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.

Division VI.—Purchases and Stores (including former activities of the Railway Storekeepers' Association). W. J. Farrell, 30 Vesey St., New York, N. Y.

Division VII.—Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago, Ill. Next convention, April, 1924, New Orleans, La.

Car Service Division.—C. A. Buch, 718 18th St., N. W., Washington, D. C.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—W. H. Hill, Agricultural Agent, New York Central, Chicago. Semi-annual meeting, December 6 and 7, Chicago; annual meeting. May 14-16, 1924, Savannah, Ga.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Next annual meeting, March 11-13, 1924, Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division V.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—W. C. Stephenson, Atlantic Coast Line R. R., Rocky Mount, N. C. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Building, Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eisenman, 4600 Prospect Ave., Cleveland, Ohio.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, 1315 Spruce St., Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Prof. J. H. Dunlap, 33 W. 39th St., New York. Regular meetings 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Railroad Division, A. F. Stuebing, Bradford Draft Gear Co., 23 W. 43rd St., New York. Annual meeting, December 3-6.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, 1310-1311 Mallers Bldg., Chicago, Ill.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—P. R. Hicks, Room 1146, Otis Bldg., Chicago. Next convention, January 15-17, 1924, Muehlebach Hotel, Kansas City, Mo.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific Ry., St. Paul, Minn. Annual meeting, May, 1924, West Baden, Ind.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Stanley J. Strong, 17th and H Sts., N. W., Washington, D. C.

ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division I.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—John Nelson, Joseph E. Nelson & Sons, 3240 South Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 53 Rushbrook St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2nd Monday in month, except June, July and August, Great Northern Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, Mo.—Thomas B. Koeneke, 604 Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Meetings, 2d Thursday, January to November, Hotel Iroquois, Buffalo, N. Y. Interim meetings, 2d Thursday, February, April, June, Hotel Statler, Buffalo, N. Y. Jubilee dinner, January 9, Hotel Statler.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—A. S. Sternberg, Belt Ry. of Chicago, Polk and Dearborn Sts., Chicago.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesian Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.

DIXIE RAILWAY CLUB.—T. C. Schley, 71 Conti St., Mobile, Ala. Regular meetings, bi-monthly, second and fourth Fridays, Battle House Hotel, Mobile, Ala.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3rd Friday in month, Room 1414 Manhattan Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Annual convention, 1924, Chicago. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George P. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. B. Hutchison, 6000 Michigan Ave., Chicago. Next convention, May 26-29, 1924, Hotel Sherman, Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—Bard Browne, Superheater Co., 17 E. 42nd St., New York. Meeting with International Railway Fuel Association.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next convention, May 20-23, 1924, Hotel Sherman, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division V.)

NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—J. S. Penney, T. J. Moss Tie Company, St. Louis, Mo. Next convention, January 17-18, 1924, Muehlebach Hotel, Kansas City, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next convention, Dec. 4-7, 1923, Hotel Urmey, Miami, Fla.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition at convention of American Railway Engineering Association.

NATIONAL SAFETY COUNCIL.—Steam Railroad Section: E. R. Cott, Safety Agent, Hocking Valley Ry., Columbus, O.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September, Copley-Plaza Hotel, Boston, Mass.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Annual Dinner, December 6, Hotel Commodore, New York. Regular meetings, 3rd Friday in month, except June, July and August, at 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—H. A. Varney, Sunbeam Electric Manufacturing Co., Evansville, Ind. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV, Signal Section.)

RAILWAY STOREKEEPER' ASSOCIATION.—(See A. R. A., Division VI.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Exhibit at A. R. A., Division V. convention, June 11-18, 1924, Atlantic City, N. J.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York. Meets with Telegraph and Telephone Section of A. R. A., Division I.

RAILWAY TREASURY OFFICERS' ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next convention, September 16-18, 1924, New York. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. L. Carrier, Car Serv. Agent, Tenn. Cent. Ry., 319 Seventh Ave., North Nashville, Tenn.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, 9 N. Jefferson St., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. KIDD, Ramapo-Ajax Corporation, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 1177 East 98th St., Cleveland, Ohio. Exhibit by Railway Equipment Manufacturers' Assn.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 605 North Michigan Ave., Chicago. Regular meetings, 3d Monday each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, 1735 Monadnock Bldg., Chicago, Ill.

Traffic News

Emigrants from the United States settling in Western Canada have numbered this year more than 7,500, this being the total as published in Canada, of the registries at the ports of entry along the line from Port Arthur westward.

The Atchison, Topeka & Santa Fe will reduce fares for the holidays, Thanksgiving, Christmas and New Year's. The sales for Thanksgiving to points in California will be November 28-29, and for Christmas, December 22 to 25, and New Year's, December 29-31. The rates will be one and one-half fares for the round trip.

At its annual election on November 6th, the Chicago Shippers Conference Association elected the following officers for the coming year: president, George A. Blair, general traffic manager of Wilson & Company; vice-president, R. W. Campbell, general traffic manager, Butler Paper Corporation; treasurer, W. J. M. Lahl, traffic manager, American Seating Company; secretary, C. T. Bradford, manager traffic department International Harvester Company.

The Chesapeake & Ohio loaded in October 76,372 cars of coal, a new high record; and, following a record-breaking business in all departments of the freight service, recorded a small surplus of cars on hand the first week in November. The number of loads of revenue freight received from connections during October, 132,800, is 8,000 above the best previous record. Car mileage on Chesapeake & Ohio lines in October averaged 46.6 miles per car per day, excluding cars in bad order.

The Temiskaming & Northern Ontario on November 1 opened its new line northward from Cochrane toward James Bay, a train of freight and passengers being run as far as Island Falls Junction, 43 miles. It is proposed for the present to run a mixed train three times a week each way. On the return trip, the first train brought a number of Indians who had never before seen a railroad; but they are said to have accepted the situation without excitement.

A regular schedule of barge line service between New Orleans, La., and Cairo, Ill., and intermediate points has been put into operation by the Mississippi-Warrior Service. Heretofore, tows have been started out from the termini only as sufficient freight was secured to fill the barges. According to the new schedule, tows will leave New Orleans on the 1st, 7th, 13th, 19th, and 26th of each month. Departures from Cairo for New Orleans will be on the 6th, 12th, 18th, 24th and 30th.

The official report made by the Department of the Interior on travel to Yellowstone National Park shows that during the season ending September 20, 1923, a total of 138,352 persons visited the park, compared with 98,223 during the season of 1922 or an increase of 41 per cent. Of the total, 44,806 persons came by rail compared with 33,358 in 1922; 91,224 came by automobile, 207 by motorcycle and 1,140 on horseback and on foot. The number of persons entering the West Yellowstone entrance was 23,115 or approximately 52 per cent of all rail visitors.

An application for an adjustment of freight rates through the western half of Kansas has been filed with the Kansas Public Utilities Commission by the Iola Cement Mills Traffic Association on behalf of all the mills in the gas belt, and by the Ash Grove Lime & Cement Company, the Fredonia Portland Cement Company, the Great Western Portland Cement Company, and the Monarch Portland Cement Company. The complaint asserts that the interstate rates on cement from points in Missouri and Iowa to points west of Salina and Hutchinson are so much lower than the rates from the Kansas Gas Belt that the Kansas Mills are unable to compete successfully in this territory.

The Baltimore & Ohio is offering a prize of $100 for the best paper submitted by any employee on the subject of traffic solicitation. The plan has been devised in an effort to attract business to its lines and thus avert the necessity for a reduction in forces during the season of the year when under normal conditions business declines in volume, and to draw out suggestions from employees in the traffic and other departments on ways to secure business for the lines. Papers are limited to 1,000 words and must be in the hands of the editor of the company magazine not later than December 10. The judges in the contest are the vice-president of traffic and commercial development, the general manager of the eastern lines and the comptroller.

The New York Central has established a record so far this year in transferring coal from car to vessel at its docks at Ashtabula, Ohio. From January 1 to November 8, 60,330 carloads or 3,318,189 tons of coal has been transferred from car to vessel over the docks at this point, compared with 45,958 cars or 2,099,001 tons during the same period in 1916 when the previous record was established. This coal has been forwarded to northwestern ports in 800 vessels prior to Nov. 8, at which time 85 per cent of the total shipments anticipated for the year had been forwarded. From May 12 to November 10, 791 cargoes of iron ore were received and unloaded at the same docks or an average of 5 cargoes for each working day during that period. The unloading plant consists of 8 electrically-driven machines, each capable of transferring 1,000 tons an hour.

In anticipation of increased travel from middle western points to Florida this winter, a number of roads are planning additional service and are revising their train schedules. Effective December 2 the Illinois Central will again place the Floridan in service and will operate it on a daily schedule, this train having been operated last winter on a tri-weekly basis. The Pennsylvania and the Louisville & Nashville will reduce the schedule of the "Southland" one and one-quarter hours between Chicago and Jacksonville and, effective December 1, will operate this train to Miami, Fla. The schedule of the Royal Palm, which operates over the Big Four and the Southern, will be shortened two and one-half hours. On December 2 the Chicago & Eastern Illinois and the Nashville, Chattanooga & St. Louis will put on a new train between Chicago and Jacksonville, Fla., which will be known as the Dixie Limited, the operation of which will be extended to Miami, Tampa and St. Petersburg, Fla., on December 31.

Claims Presented Increase

The number of loss and damage claims presented to 219 of the principal carriers of the United States and Canada was 1,439,154 during the first six months of 1923 as compared with 1,110,155 for the same period of 1922 and 1,347,393 in 1921. Although the number of claims presented has increased, the payments have decreased, those in the first six months in 1923 totaling $23,225,924, as compared with $27,380,061 in 1922 and $55,509,014 in 1921. The ratio of claim payments to freight revenue was 1.03 in 1923, compared with 1.47 in 1922 and 2.98 in 1921. Payments on fresh fruits and vegetables totaled $4,217,840 in the first half of 1923, as compared with $8,830,192 in the same period of 1922 and $13,898,081 in 1921. Damage classed as unlocated damage, rough handling of cars, improper handling, loading, unloading or stowing, defective or unfit equipment, improper refrigeration or ventilation, freezing or heater failure, concealed damage, wrecks and fire or marine loss or damage, amounted to $13,100,188 or 56.4 per cent of the total claim payments in 1923 compared with 50.2 per cent in 1922 and 48.1 per cent in 1921.

Freight Rates on Wheat to Liverpool from Argentina

The freight rate on wheat from the wheat-producing region of Argentina to Liverpool is from three to eleven cents a bushel less than the combined rail and ocean rate from the wheat-producing areas of the United States to Liverpool, according to a study of foreign and domestic freight rates on wheat being made by the United States Department of Agriculture. "This difference is due primarily to the proximity of the wheat-producing areas in Argentina to the seaboard," the department says in a press statement, though the "advantage of the shorter rail hauls is partly offset by the relatively higher ocean rates. The average railroad freight

rate per bushel per mile is considerably higher in Argentina than in the United States.

"The average distance of the wheat-producing areas to the seaboard in Argentina is 140 miles with a railroad freight rate of approximately 10 cents a bushel, as compared with an export rate in the United States of 27 cents a bushel from McPherson, Kan., to New Orleans, 974 miles, and 22.6 cents a bushel from Larimore, N. Dak., to New York, via Duluth and Buffalo, a distance of 1,754 miles. The longest haul in Argentina for any considerable quantities of wheat is 361 miles, with a freight rate of 16 cents a bushel; the shortest haul is 8½ miles; rate less than three cents a bushel.

"The ocean freight rate from Rosario to Liverpool during the period from January 1 to September 30 of this year averaged around 14.7 cents a bushel, as compared with an average rate of 4.8 cents a bushel from New York and 8.6 cents from New Orleans to Liverpool.

"In Argentina, especially in the region contiguous to Rosario, it is not customary for farmers to haul wheat to market. This is done by special contractors, who make a charge according to the distance. The charge in that district for an average haul of about 9 miles is a little over 3 cents a bushel. This charge is therefore one of the factors that enters into the price paid the Argentine grower for his wheat. In the United States, farmers haul their own grain to the country shipping point, as a general rule, and the labor cost of this service is absorbed in the production cost of the wheat. The value of this labor in the principal producing regions of the United States is estimated at one cent per bushel per mile; the average hauling distance being variously estimated from 3.8 to 5.8 miles."

Interstate Commerce Commission Continues Grain Rate Investigation

Hearings before the Interstate Commerce Commission in response to a petition of eight middle western states for an adjustment of freight rates on grain, grain products and hay, which began in Kansas City on November 14, will also be held at Atlanta, Ga., on January 3, at Chicago on January 15, and at Washington on January 21, in addition to the hearings previously announced.

The testimony of the witnesses for the railroads at the hearing which opened at Kansas City, Mo., on November 19, as reported in the *Railway Age* of November 24, page 983, occupied three days.

W. B. Storey, president of the Atchison, Topeka & Santa Fe, took the stand on November 21. He took issue with Judge Reed regarding the amount of the corporate surplus of the Santa Fe, denying that it had been increased from $49,000,000 in 1913 to $230,000,000 in 1923, and stating that the surplus on the latter date was $141,000,000. He contended that the corporate surplus built up by the carriers was of no concern to the shippers any more than a customer is concerned with the profits of the merchant with whom he deals. The second railroad president to take the witness stand was Samuel Felton, president of the Chicago Great Western, who described the needs of railroads of the west, particularly the Chicago Great Western. His testimony also included an outline of the financial conditions of railroads and their required improvements.

Others testifying for the railroads were H. W. Potter, vice-president of the Peters Trust Company, Omaha, Nebr.; A. C. Jobes, vice-president of the First National Bank of Kansas City and a director of the Atchison, Topeka & Santa Fe; L. T. Wilcox, assistant to the freight traffic manager of the Union Pacific at Omaha, Nebr.; W. J. Bailey, governor of the Federal Reserve Bank at Kansas City; J. A. Streyer, traffic manager of the Southern Classification territory of the American Short Line Railroad Association; E. A. Hadley, chief engineer of the Missouri Pacific; Henry C. Brent, president of the Fidelity Savings Trust Company, Kansas City, and one of the receivers of the Salina Northern; S. G. Lutz, chief traffic officer of the Chicago & Alton; R. G. Merrick, general freight agent of the Atchison, Topeka & Santa Fe; Carroll B. Merriam, vice-president of the Central Trust Company, Topeka; B. F. Parsons, assistant general freight agent of the Chicago Great Western, and L. C. Mahoney, assistant general freight agent of the Chicago, Burlington & Quincy.

The hearing at Kansas City adjourned on November 23 and reconvened at Minneapolis on November 26.

Commission and Court News

Interstate Commerce Commission

The Commission has announced additional hearings in its investigation of rates on grain and grain products, to be held at Atlanta on January 3, Chicago on January 15, and Washington on January 21, before Commissioners Esch and Campbell and Examiners Keene and Beach.

The Commission has suspended until March 25, the operation of certain schedules as published in various transcontinental tariffs issued by Agents R. H. Countiss, W. S. Curlett, B. T. Jones and H. Wilson. The suspended schedules propose changes in the rules governing terminal and other charges, etc., in connection with rates on various commodities between Pacific coast points and intermediate territory on the one hand and eastern points on the other, resulting in restricting the rights of shippers to the privileges now published in the tariffs of individual carriers.

Personnel of Commissions

Lucius B. Friedli has resigned as secretary to Chairman Meyer, of the Interstate Commerce Commission, to engage in private practice at Washington and to serve as special agent for interests requiring representation in Washington.

E. P. Morrow to Be Appointed to Labor Board

Edwin P. Morrow, who is to retire on December 11 as governor of Kentucky, has accepted appointment by President Coolidge as a member of the Railroad Labor Board, to succeed R. M. Barton, it was announced at the White House on November 26. The proposed appointment is said to be in accord with an agreement entered into by President Harding when Judge Barton was reappointed last spring. Governor Morrow was offered the appointment at that time, but asked to be allowed to serve out his term as governor. The nomination will be sent to the Senate when it convenes next week. Judge Barton was given a recess appointment so that his term will expire upon the appointment of his successor.

Mr. Morrow was born at Somerset, Ky., on November 28, 1878, and was educated at St. Mary's College, St. Mary's, Ky.; Williamsburg Institute and the Cincinnati Law School, from which he was graduated in 1900. He became a member of the law firm of Morrow & Morrow at Somerset, and in 1907 was Republican candidate for governor of Kentucky; from 1911 to 1915 he was United States district attorney for the eastern district of Kentucky, and he was nominated by the Republican caucus for United States senatorship in 1912. He was elected governor of Kentucky in 1919 for the term of four years, which is now expiring. He served during the Spanish-American War and is widely known as a political and after-dinner speaker.

Judge Barton, when told of the appointment of Mr. Morrow, was quoted as denying that he had resigned.

State Commissions

Plans for New York Central Freight Tracks in Manhattan

The New York State Public Service Commission and the New York State Transit Commission (for New York City), sitting jointly, held a hearing in New York City, on Monday last, to consider the plans of the New York Central for the elevation of its tracks and the introduction of electric traction, on the line from Spuyten Duyvil southward along the Hudson river shore to the extensive freight terminals of the road at 60th street, 30th street and St. John's Park, a distance of 11 miles, the total cost of the proposed changes to be from sixty to seventy millions of dollars.

The commissions are acting under two laws; the general law, in which a portion of the cost of abolishing grade crossings is paid

by the state and the city and another law, passed by the last legislature, requiring the abolition of steam locomotives throughout New York City. The railroad company presented elaborate plans describing the changes proposed by it, and including proposed improvements and enlargement of freight station facilities.

Beginning at Spuyten Duyvil, it is proposed to build a new drawbridge 24 ft. above the water; and the tracks would be continued on the higher level south to Dyckman street; thence to 135th street there would be a return to the present low grade and there would be improvements in the freight facilities between 145th street and 125th. At 129th street, the tracks would go above the street leading to the ferry. Viaducts would be required at certain points between 96th street and 79th. From 72nd street southward, the tracks would rise to the new grade at 59th sreet, south of which all tracks would be on elevated structures in the streets. Some changes in the route of the tracks would be made between 36th street and 17th street. The company proposes abandoning the present freight terminal at St. John's Park (south of Canal street) and to establish a new terminal north of Canal street between Spring and Clarkson streets, west of Washington street.

Chairman McAneny, of the Transit Commission, said at the hearing that no doubt further special legislation would be necessary; and the present hearings are designed to bring out the facts needed to draft a law. The hearing was adjourned to Tuesday, December 6.

Supreme Court of the United States

Order Cancelling Penalty Charge on Lumber Held for Reconsignment Sustained

Suit was brought in the Illinois federal courts against the United States by an Illinois lumber concern to set aside as void an order by the Interstate Commerce Commission against carriers, entered February 11, 1922 (American Wholesale Lumber Assn. v. Director General, 66 I. C. C. 395), eliminating, as no longer required under existing conditions, the penalty charge of $10 per car per day on lumber held at reconsignment points, established by the Director General of Railroads on October 20, 1919, "to prevent undue detention of equipment" under the emergency then existing. Cancellation of this charge was opposed by some associations of lumber manufacturers and dealers who customarily ship direct from the mills to their own lumber yards and have little occasion to use this reconsignment privilege. The imposition of the penalty was a direct benefit to them, since it subjected the jobbers, their competitors, to a severe handicap, and to that extent curtailed the activities of these rivals.

The plaintiffs claimed that the order cancelling the penalty charge infringes their rights both as shipper and as prospective carrier. As shipper they claimed to be injured because the jobbers were relieved from the handicap of the penalty charge, and because of the danger of car shortage by detention of cars at reconsignment points. Their claim of injury as prospective carriers was that they were constructing in connection with a mill in Mississippi a local railroad, and that their cars would naturally move on connecting lines and be used, in the absence of a debarring penalty charge, for storage at reconsignment points, and that this would have the effect of depriving railroads of the use of their property without due process of law.

The Supreme Court of the United States holds that the plaintiffs had failed to show, as they must do to maintain this suit, that the order subjects them to legal injury, actual or threatened. The court said: "It is not alleged that the carriers wish to impose such charges and, but for the prohibition contained in the order, would do so. For aught that appears carriers are well satisfied with the order entered. Cancellation of a charge by which plaintiffs' rivals in business have been relieved of the handicap theretofore imposed may conceivably have subjected plaintiffs to such losses as are incident to more effective competition. But plaintiffs have no absolute right to require carriers to impose penalty charges. Compare Interstate Commerce Commission v. Chicago, R. I. & P., 218 U. S. 88, 111. Plaintiffs' right is limited to protection against unjust discrimination. For discrimination redress must be sought by proceedings before the commission. Its findings already made, and the order entered, negative such claims in this connection. The correctness of these findings cannot be assailed here; among other reasons, because the evidence on which they were made is not before the court."

As to plaintiffs' claims that they might suffer from car shortage and diversion of equipment of their projected railroad, if their fears should be realized it would be open to them to apply to the commission for relief. Decree dismissing the bill was affirmed.—Hines, Yellow Pine Trustees v. United States. Decided November 12, 1923. Opinion by Justice Brandeis.

Assessment of Tangible and Intangible Railroad Property

The Supreme Court of the United States has affirmed the judgment of the Texas Supreme Court (229 S. W. 493) sustaining the assessment on the intangible property of the International & Great Northern in Harris County, Texas, for 1915 (reversing a contrary judgment of the Texas Court of Civil Appeals, 197 S. W. 104-3). This assessment is fixed by the State Tax Board, which values the intangible property as a whole and then apportions the amount among the several counties on a mileage basis. Under the Texas statute the value of the intangible is to be determined by deducting the value of the tangible from the value of the entire railroad property. To enable the Board to do this the company is required to furnish data.

The aggregate assessment for 1915 on this railroad's property in Harris County, was $1,709,332. Of this amount $603,227 was on intangible property. The tax rate was $1.09½ per $100 of value. The amount of the tax so laid was $6,605. The trial court, whose judgment is now affirmed, found that the actual value of the tangible property alone in Harris County, was $3,205,202; and that the assessment on this was on only 34 per cent of that value.

The receivers of the railroad contended that the physical property was undervalued, resulting in an overvaluation of the intangible, amounting to a denial of due process. It was held that there was no evidence of arbitrary action, fraud, or gross error in the system on which the valuation was made, and mere errors of judgment are not subject to review in this proceeding.

The receivers contended that the tax was void, under the equal protection clause, because the tangibles were intentionally and systematically assessed, by the county authorities, at not more than 38 per cent of their actual value; while intangible were assessed by the State Board at their full value. The trial court having found that the aggregate assessment on tangibles and intangibles in Harris County was about 45 per cent of the aggregate true value, whereas the other property in the county was assessed at about 50 per cent of its true value, the Supreme Court holds that the railroad was not, in essence, subjected to any discrimination, and the requirement of the equal protection clause of the Constitution was satisfied.—Baker v. Druesedow. Decided November 12, 1923. Opinion by Justice Brandeis.

Labor Board Decisions

Time and One-Half After Eighth Hour for Station Employees

The Labor Board has ordered that station employees on the Boston & Maine be paid at the rate of time and one-half after the eighth hour, instead of after the ninth hour, as at present. The Board overruled the road's contention that many of its employees in other departments are not paid punitive rates after eight hours of service, and upheld the employees' request that their working rules be made identical with rule 57 under decision No. 1621, which was established by the Labor Board as reasonable for this class of employees.—*Decision No.* 1992.

Application of Overtime Rule When Meal Period is Worked

In a dispute between the maintenance of way employees of the Norfolk & Western and the management in regard to the application of the overtime rule when the meal period is worked, the Labor Board has ordered that the payment of time and one-half starts at the expiration of the tenth continuous hour on duty, computed from the employees' regular starting time. It further ordered that where this continued service includes meal period, no deduction shall be made therefore, and the employee shall, at the first opportunity, be allowed 20 minutes in which to eat.—*Decision No.* 2015.

Foreign Railway News

Earnings of Yugo-Slav State Railways

The operations of the State Railways of Yugoslavia resulted in a net surplus of 234,054,587 dinars* for 1922, according to Commerce Reports. The surplus for the first 6 months of 1923 was 102,294,463 dinars. Gross receipts in 1922 amounted to 1,267,318,619 dinars, expenses to 1,033,264,032 dinars and net receipts to 234,054,587 dinars in 1922. For the first 6 months of 1923, gross receipts totaled 757,170,049 dinars, expenses 654,875,586 dinars and net receipts 102,294,463 dinars.

Portuguese Railway Earnings Increase

Net earnings of the Portuguese railways amounted to 10,322,869 escudos† in 1922. This improvement resulted from greatly increased business over 1921, when there was a deficit of 862,103 escudos, according to Commerce Reports. In spite of the increased earnings, however, it is estimated that the roadway and equipment are in need of repairs and replacements to the value of 12,000,000 escudos. Nevertheless, the crisis is believed passed, and plans are under way to recommence the payment of dividends and to retire outstanding obligations which have been overdue for some time.

Consolidation of Swedish Railways Under Consideration

The consolidation of the privately owned and operated railways in Sweden into 12 systems is being considered, according to Acting Commercial Attaché H. Sorensen at Copenhagen. The private railways have a total length of 6,024 miles compared with 3,540 miles owned and operated by the government. The possibility of this consolidation of privately owned lines or of having the state take them over has long been discussed. For financial reasons, the consolidation plan suggested by a railroad commission appointed in 1918 seems to be favored.

New Railway Proposed for Peru

A concession has been definitely granted by the Peruvian government for the construction of a railway line from the port of Yurimaguas, on the Huallaga river, a tributary of the Amazon, to a point (as yet undecided) on the Pacific coast of Peru (about 400 miles), located between the two ports of Pacasmayo and Paita, according to the Times (London) Trade Supplement. The line, which will be of standard gage (1.43 meter), has been surveyed for the second time, several important modifications in the route, reducing construction costs, having been adopted.

The building of the line will be carried out in sections each of 12 or more miles, but the whole work must be completed within eight years from the date of the ratification of the contract by national congress.

In connection with the railway there will also be provided one or more docking systems to be erected in the terminal port on the Pacific and on the navigable rivers reached by railroads or cart-roads. Additional docks will be constructed at some port on the Amazon river, as well as a number of warehouses.

It is likewise proposed to grant, under the same concession, permits for the erection of factories, which will be operated by electric power, while the right is granted to lay pipe-lines and to erect the necessary installations for the transport of petroleum, water, or gas.

Supplementary works to be undertaken by the concessionnaire will include: (*a*) Two cart-roads, one of which, extending from a point on the Marañon river close to the town of Barranca, reaches the Paranapura river, passing to Jeberos; and the other, extending from a navigable point on the Huallaga river, reaches Tarapoto and Lamas; (*b*) two railroads of 60-centimeter (23.62 in.) gage, one of which, extending from a point on the Marañon river, close to the town of Barranca, reaches the Paranapura river, passing to Jeberos, and another, extending from a navigable point on the Huallaga river, reaches Tarapoto and Lamas.

*The par value of the dinar is $0.193, and its value on November 1, 1923, was $0.012.

†The average exchange value of the escudo in 1922, on a monthly basis, was $0.066548.

The Reorganization of Austria's Railways

A law providing for the reorganization of the Austrian State Railways was passed on July 19, 1923. This law sets up a government corporation to be known as the "Oesterreichische Bundesbahnen." The need for drastic railway reform is shown by the fact that the largest deficit item in the Austrian budget since the war has been on account of the Federal railways, and estimates for 1923 charge over half of the expected deficit to the railways. The provisions of the new law are discussed fully in a recent report made by American Trade Commissioner Upson.

There are four principal factors to which losses in operation may be attributed. First, the portion of the railway system of the former Austro-Hungarian Monarchy now within the territory of the Austrian Republic, was always operated at a loss because of the high percentage of mountainous track. In former days these losses could be offset by profitable operation of the level stretches in other parts of the Monarchy, which, however, are now in Czechoslovakia, Hungary, and Poland.

Second, the railways must import their fuel, as a negligible amount of coal is produced in Austria. Efforts to make favorable contracts for the purchase of fuel from neighboring countries have failed, owing to the ever-changing conditions in central Europe. Electrification on an extensive scale cannot be considered at present on account of the great expense involved.

The surplus of personnel is a third unmistakable factor contributing to the unsatisfactory situation, and is, therefore, to be considerably reduced before June 30, 1924.

The fourth factor, and probably the most important source of operating losses, is the unprofitable operation by the government. A total of 2,674 miles, or 81 per cent of the total mileage of Austrian railways, is owned and operated by the government and is under the management of the Railway Ministry (recently amalgamated with the Ministry of Commerce), with a number of suboffices in various cities.

On the establishment of the Republic of Austria it was realized that rehabilitation of the financial condition of the country would depend primarily on the elimination or, at least, a considerable reduction, of the railway deficit. The general commissioner to Austria has tried continually to bring about a solution. An advisory committee, selected to make recommendations for the reorganization of the Federal railways this year, decided that the government should retain control, but should give up administration, and that all political influence should be abolished. Centralized administration was favored over the present decentralized system. The idea of turning the railways wholly over to private management was opposed.

The federal law of July 19, 1923, provides for "the creation of a corporation in Vienna for the purpose of conducting the operations of the federal railroads." This corporation must administer the entire property of the railways and act as a trustee for the government on business principles.

An executive committee composed of five members will be held responsible to a commission of 14 directors for actual operations. Eleven members of this commission are to be business men or experts in handling transportation problems, and are to be appointed by the government for a term of three years. Three members are to be chosen by the railway employees. The executive committee is to be appointed by the commission and may be recalled by consent or order of the government. The chairman of the committee will have the title of general manager and each of the other members that of manager.

In addition to managing operations, the executive committee must pass on all reorganization questions, formulate operating policies and plans, appoint and manage the personnel, and submit a financial balance sheet monthly and annually. They may raise short-term interior loans of low denominations. The commission of directors is charged with general supervision and with safeguarding the public interests.

The government reserves the right to give or withhold approval of tariff changes and large or long-term loans, and will supervise social and safety measures and regulate construction and maintenance. The Ministries of Commerce and Finance will receive the monthly and yearly balance sheets.

The object of the new law is to eliminate certain influences that hindered the operation of the railroads on an economic basis.

However, as the government is to appoint 11 of the 14 directors, retain power to remove the managers, and regulate large financial undertakings, and, as the law may be so interpreted as to give the government control over maintenance and construction, the energetic measures required for rational operation may be hampered. Further developments are necessary to show whether the compromise represented by the new law can bring about actual rehabilitation of the railroads.

How Consolidation Has Worked Out in Britain—A Typical Road, the London, Midland & Scottish

The London, Midland & Scottish, which is the successor to 35 separate companies, is one of the four railway companies organized under terms of the Railways Act of 1921. Consolidation in England has been effected by an exchange of securities and not by acquisition of smaller lines through purchase by a larger company. Consolidation there has been regional and non-competitive, i. e., the country has been divided into four territories with one railway for each and there is very little overlapping of territories. This amalgamation was compulsory but it was effected with little friction or criticism from any quarter.

The principal companies consolidated to form the London, Midland & Scottish were the London & North Western, the Caledonian, the Midland, the Lancashire & Yorkshire, the Glasgow & South Western, the Highland, the Furness and the North Staffordshire. The newly formed system, excluding the Caledonian, the North Staffordshire and two minor lines, is capitalized at approximately £335,297,585 and its employees number 265,000. The system operates approximately 8,000 route miles and is the largest of the country's four systems.

A. Watson

D. A. Mathieson

J. H. Follows

S. H. Hunt

The consolidations have of necessity made necessary many changes in official personnel. Arthur Watson, formerly general manager of the Lancashire & Yorkshire, is general manager (corresponding to president) of the new company. Mr. Watson was born in Manchester in 1873 and was educated at the Manchester Grammar School and at the Victoria University, Manchester. In 1890 he was articled as a civil engineer to the chief engineer of the former Lancashire & Yorkshire Railway. During the period 1897-1900 he was divisional engineer for maintenance and became chief assistant engineer in 1905, holding that position until he became superintendent of the line (a position comparable to that of general manager in this country) in 1911. In 1912 Mr. Watson visited the United States and Canada and made a comprehensive study of American and Canadian railway practice. In 1914 he was elected a member of the Railway Executive Committee. which directed the operation of the British railways during the war. In April, 1918, Mr. Watson was appointed assistant general manager of the Lancashire & Yorkshire, in combination with the position of superintendent of the line, and in January, 1919, was appointed general manager. He was appointed general manager of the London & North Western Railway on January 1, 1921, and since January 1, 1923, has occupied the position of general manager of the London, Midland & Scottish.

Donald Alexander Matheson, deputy general manager, for Scotland, of the London, Midland & Scottish, was born in Perthshire and was educated at Perth Academy. He studied also at Watt College, Edinburgh, and Owens College, Manchester. He was engaged in sundry engineering work and, in turn, acted as an engineering assistant on construction of the Edinburgh Suburban Railway, as an engineering assistant on the engineering staff of the London & North Western at Manchester and as contractor's resident engineer and agent on construction of the Lanarkshire & Ayrshire Railways. He was subsequently engaged for about five years as resident engineer on construction of the Glasgow Central Underground Railway, for the Caledonian Railway, on completion of which he was appointed divisional engineer for the Western division of the Caledonian Railway, and in 1899 was appointed engineer-in-chief. In September, 1910, he was appointed general manager of the Caledonian. Mr. Matheson was also a member of the Railway Executive Committee during the war.

J. H. Follows, who has been appointed chief general superintendent of the London, Midland & Scottish, with headquarters at Derby, was previously general superintendent of the Midland Railway. Mr. Follows, who was born in Derbyshire, entered the service of the Midland Railway in June, 1890, at twenty years of age, and, after passing through various grades, was appointed stationmaster at Sawley, on the Trent & Derby line, in 1895. He was later promoted to more important positions at Normanton and at Derby. In December, 1901, he was given charge of the Derby district as traffic inspector and in 1907 was transferred to the personal staff of the general superintendent. Becoming superintendent of freight trains in 1911, Mr. Follows was appointed divisional superintendent the following year, his duties embracing practically the whole of the line and two years later he was made superintendent of operation. From 1917 Mr. Follows acted as general superintendent. In 1919 he succeeded to the post of general superintendent of the Midland, becoming chief general superintendent of the London, Midland & Scottish on January 1, 1923. It may be recalled that Mr. Follows was closely associated with the introduction of "train control" (a highly developed form of train dispatching) on the former Midland Railway.

Stanley H. Hunt, chief goods manager of the London, Midland & Scottish, held a similar position with the London & North Western prior to the amalgamation. Mr. Hunt entered the service at Liverpool (Waterloo) goods station in 1880. In 1896 he was appointed goods agent at Canada dock, and shortly afterwards became chief clerk to the district goods manager at Liverpool. Two years later he filled the position of assistant district traffic superintendent at Lancaster. In February, 1902, Mr. Hunt went to London as assistant goods superintendent at Broad Street Station and in the following year he went to Garston docks as traffic superintendent. Soon after the outbreak of the war Mr. Hunt went to France on an inquiry in connection with the Red Cross Society, and later he was given other important commissions from the government.

The company has planned immediate expenditures for additions and betterments totaling £4,000,000 and an additional £10,000,000 is contemplated—partly as a means of relieving unemployment.

Equipment and Supplies

Locomotives

THE NEW YORK STEEL EXCHANGE, INC., Woolworth building, New York City, is inquiring for a 25-ton steam locomotive, without tender, suitable for quarry work on a track of 66-in. gage, to burn cord-wood. This locomotive is for export.

Freight Cars

THE PHILADELPHIA & READING is inquiring for 1,000 hopper cars of 70 tons' capacity.

THE NORFOLK & WESTERN is asking prices on the rebuilding of 1,000, 57½-ton hopper cars.

THE GREAT NORTHERN has ordered 100 underframes from the St. Paul Foundry Company.

THE SOUTHERN RAILWAY has ordered 1,000 box cars from the American Car & Foundry Co.

THE MISSOURI PACIFIC will repair 100 gondola cars and 200 general service cars in its own shops.

THE LEHIGH VALLEY will have repairs made to 200 gondola cars at the shops of the American Car & Foundry Co.

THE MISSOURI PACIFIC is having repairs made to 1,000 freight cars at the shops of the Sheffield Car & Equipment Co.

THE GREAT NORTHERN, reported in the *Railway Age* as inquiring for 500 stock cars, will build these cars in its own shops.

THE NEW YORK CENTRAL will convert 1,000 freight cars to 500 flat cars, 300 double-deck stock cars and 200 single-deck stock cars.

THE ST. LOUIS SOUTHWESTERN, reported in the *Railway Age* of November 24 as inquiring for 150 steel underframes, has decided not to buy this equipment.

THE SOUTHERN RAILWAY, reported in the *Railway Age* of November 24 as inquiring for 1,000 steel underframes, has placed the order for these underframes.

THE CHICAGO, BURLINGTON & QUINCY, reported in the *Railway Age* of October 27 as inquiring for 1,000 gondola cars of 50 tons' capacity has decided not to buy this equipment.

THE UNIVERSAL PORTLAND CEMENT COMPANY, reported in the *Railway Age* of September 18 as inquiring for 50 hopper cars of 70 tons' capacity, has decided not to buy this equipment.

THE ALABAMA & VICKSBURG, reported in the *Railway Age* of August 4 as inquiring for 200 box cars of 40 tons' capacity, 100 flat cars of 50 tons' capacity and 100 gondola cars of 50 tons' capacity, has ordered the gondola cars from the American Car & Foundry Company and the box cars and flat cars from the Chickasaw Shipbuilding Company.

Passenger Cars

THE VIRGINIAN is asking for prices on one business car.

THE LAURINBURG & SOUTHERN has ordered a gasoline motor car from the Edwards Railway Motor Car Company.

THE WASHINGTON & LINCOLNTON has ordered a gasoline motor car from the Edwards Railway Motor Car Company.

THE BIRMINGHAM & SOUTH-EASTERN has ordered a gasoline motor car and trailer from the Edwards Railway Motor Car Company.

THE MINNESOTA, DAKOTA & WESTERN has ordered one gasoline motor coach from the Oneida Manufacturing Company, Greenbay, Wis.

THE ST. LOUIS, KENNETT & SOUTHEASTERN has ordered a gasoline motor car and a trailer for this car from the Edwards Railway Motor Car Company.

THE BALTIMORE & OHIO has ordered a 30-ft. gasoline motor car 29 ft. 7 in. long and 8 ft. wide, from the Edwards Railway Motor Car Company.

THE SUMTER & CHOCTAW has ordered a gasoline motor car 27 ft. 2 in. long and a trailer car 28 ft. 7 in. long, from the Edwards Railway Motor Car Company.

THE MOUNT JEWETT, KINZUA & RITERVILLE has ordered a specially designed gasoline motor car 28 ft. 11 in. long and 8 ft. wide, to be operated by one man, from the Edwards Railway Motor Car Company.

Iron and Steel

THE PENNSYLVANIA has ordered 94,000 tons of rails from the United States Steel Corporation, 94,000 tons from the Bethlehem Steel Corporation and 12,000 tons from the Inland Steel Company.

Machinery and Tools

THE WABASH has ordered one 22-ton 8-wheel standard gage locomotive crane from the Orton & Steinbrenner Company, Chicago.

Miscellaneous

THE FLORIDA EAST COAST has ordered from the Virginia Bridge & Iron Co., a locomotive turntable to be installed at New Smyrna, Fla.

Signaling

THE PITTSBURGH & LAKE ERIE has ordered from the General Railway Signal Company an electric interlocking, 68 working levers, for installation at Pittsburgh, Pa. The plant will include six position-light signals.

Automatic Train Control on the L. & N.

The Louisville & Nashville has contracted with the Union Switch & Signal Company for the installation of automatic train control, continuous, two speed, on its line between Corbin, Ky., and Etowah, Tenn., 135 miles.

South Australian Railways Seek American Bids on Large Equipment Order

C. E. Burnham, on behalf of the manufacturers for the South Australian Railways, has asked the *Railway Age* to announce that these railways are seeking American bids on the following:

(1) Twenty Locomotives (10 Mountain Type and 10 Pacific Type) and Bogie Tenders, 5 ft. 3 in. gage.

(2) Six Hundred Steel Gondola Cars, 40 Tons' capacity, 5 ft. 3 in. gage.

(3) One Hundred Steel Louvred Cars, 30 Tons' capacity 5 ft. 3 in. gage.

(4) Two Wrecking Cranes, 5 ft. 3 in. gage.

(5) Five Hundred Steel Box Cars, 30 Tons' capacity, 5 ft. 3 in. gage.

All the specifications for the above rolling stock can be inspected and particulars taken at the office of the *Railway Age*, 30 Church street, New York. Quotations must be forwarded to C. E. Burnham, on behalf of manufacturers for the South Australian Railways, 16 Cowra Chambers, Grenfell street, Adelaide, South Australia (Cable address "Exactus," Adelaide).

Tenders must reach South Australia by December 1 at the latest date, addressed to Mr. Burnham at the above address.

With these specifications there are special items of importance to manufacturers, which may be obtained from the *Railway Age*.

Quotations cabled must state clearly whether price is for re-erection or ready for service delivered at place stated in specifications. Owing to shortage of time there is not a day to be delayed, and if contract prices mailed care must be taken with regard to period necessary for transmission by ordinary mail. Tenders must include exchange added.

Supply Trade News

The Stafford Roller Bearing Car Truck Corporation, Lawton, Mich., has been placed in receivership. **Justus S. Stearns** has been appointed receiver.

H. B. Thurston, sales manager of the **Talmadge Manufacturing Company,** Cleveland, Ohio, was on November 23 elected vice-president of the company.

The Chicago Concrete Post Company has appointed the **Western Electric Company** distributor of its concrete lighting standards and railway supplies used in railway signaling.

Jay C. Lathrop, representative of the **Conveyors Corporation of America,** Chicago, Ill., in the Cincinnati district, has removed his office to 503 Neave building, Cincinnati, Ohio.

Henry Pearson, president of the Wason Manufacturing Company, Springfield, Mass., from 1906 to 1910, and vice-president since that time, died on November 27 at the age of 71. The company is a subsidiary of the J. G. Brill Company, Philadelphia, Pa.

The Independent Equipment Corporation, Chicago, has purchased from the Goodwin Car & Manufacturing Company, its plant at Clearing, Ill., including 25 acres of land improved with several one-story crane and machine shop buildings and its machinery and plant equipment. After extensions the plant will be equipped to care for all kinds of railroad freight car repairs.

Dwight P. Robinson & Company, Inc., of New York, have opened an office at Atlanta, Ga., in the Healey Building, with **W. Rawson Collier** in charge. Mr. Collier was for many years with the Georgia Railway & Power Company. He joined the Dwight P. Robinson forces several months ago, coming to them from the Poughkeepsie Gas & Electric Company. He is a graduate of the Massachusetts Institute of Technology, and has been prominently identified with the work of the National Electric Light Association, the American Institute of Electrical Engineers, the American Gas Association and the Illuminating Engineering Society. The opening of the Atlanta office gives the company a total of eight branches. Other branches are at Chicago, Pittsburgh, Youngstown, Philadelphia, Montreal, Los Angeles and Rio de Janeiro.

The Independent Equipment Corporation, with offices in the McCormick building, Chicago, has been organized for the purpose of repairing freight car equipment, leasing and repairing tank cars and manufacturing miscellaneous car parts. This company has bought the plant of the **Goodwin Car & Manufacturing Co.,** located at Clearing, Ill. The plant covers an area of 25 acres and is equipped with buildings, trackage and machinery. Additional machinery and facilities have been arranged for to equip fully the shops to take care of all kinds of railroad freight car repairs. The officers of the corporation are: **M. P. Kraffmiller,** president; **J. E. Tesseyman,** vice-president and general manager; **R. R. Weaver,** vice-president and engineer; **J. E. Dittus,** secretary in council; **A. E. Higgins,** treasurer, and **W. R. Mybeck,** purchasing agent. The personnel of this organization includes men who have served 15 to 25 years in the development of the freight car industry. The company has a sufficient volume of business already contracted for to keep the plant in steady operation until January 1 with a good outlook for additional business.

Westinghouse-Japanese Arrangement

A new company known as the Mitsubishi Electric Manufacturing Company has been formed with a reported capitalization of $7,500,000.

In recent years electrical apparatus has become one of Japan's largest imports, and since Japan's principal exports consisting of silk, copper and objects of art, cannot be expanded by a corresponding degree, it has been deemed wise by the Japanese to begin the manufacture of electrical machinery and supplies to obviate a possibly unfavorable balance of trade. The company consists of a Japanese manufacturing company which will be supplied with technical skill and experience by the Westinghouse Company.

A third party to this agreement is Takata & Co., 30 Church street, New York City. This concern which is the Japanese agency of the Westinghouse Company will act as distributor for the Mitsubishi Electric Manufacturing Company and will also continue to import such Westinghouse products as will be supplied from America.

Trade Publications

STOKERS.—The Westinghouse new model multiple retort underfeed stoker is described and fully illustrated in a 14-page brochure recently issued by the Westinghouse Electric & Manufacturing Company, Philadelphia, Pa. It shows the results that have been obtained in this line after thirty-five years' experience in the design and manufacture of combustion equipment. The stoker is built in all types and sizes to meet the specifications for industrial and central station requirements.

DATA BOOK.—The Truscon Steel Company, Detroit, Mich., has issued an unusually complete book of data on the properties and uses of Truscon metal lath, founded on an exhaustive study of theoretical considerations and practical experience in the field. The various uses or applications of the lath are treated individually with a descriptive introduction followed by specifications and accompanied with photographs illustrative of actual installations and detailed drawings showing the method of application. The intent has been to provide information of value to the engineer and architect and also to the foreman plasterer.

THE STATISTICAL CONDITION OF THE LOCOMOTIVE MARKET

	Orders		Locomotives installed and retired								
Month	Domestic orders reported during month	Total domestic orders Jan. 1 to date	Installed during month	Aggregate tractive effort	Total installed year to date	Retired during month	Aggregate tractive effort	Owned at end of month	Aggregate tractive effort	On order as of first of following month	Building in railroad shops
January	358	358	*	.....	*	...	.....	....	.....	1,507	..
February	486	844	*	.....	589	...	.....	....	.....	1,945	..
March	514	1,358	346	.....	935	...	.....	....	.....	1,974	..
April	150	1,508	293	.....	1,228	...	.....	....	.....	1,956	..
May	90	1,598	469	.....	1,697	...	.....	....	.....	2,041	..
June	141	1,739	301	.....	1,998	...	.....	....	.....	1,902	..
July	9	1,748	223	.....	2,221	...	.....	....	.....	1,772	..
August	8	1,756	362	.....	2,583	...	.....	....	.....	1,517	..
September	8	1,764	384	22,342,517	2,967	260	7,191,302	64,720	2,506,469,051	1,242	7
October	50	1,814	408	21,665,487	3,375	301	7,935,709	64,827	2,520,200,846	942	15
November	46	....	...	.....	....	...	.....	....	.....	....	..
December	...	....	...	.....	....	...	.....	....	.....	....	..

(1) Details as to orders from *Railway Age* weekly reports. Figures include all domestic orders placed with builders and railroad shops, but not rebuilt equipment.

(2) Figures as to installations and retirements prepared by Car Service Division, A.R.A. published prior to October in reports relative to progress made on A.R.A. transportation program and more recently in greater detail given in Form C.S. 56A-1. Figures cover only those roads reporting to the Car Service Division. They include equipment received from builders and railroad shops. Figures of installations and retirements alike include also equipment rebuilt to an extent sufficiently so that under the accounting rules it must be entered in the equipment statement as new equipment. Figures as to orders as given in first two columns of table are not therefore strictly comparable with figures relating to installations given in succeeding columns.

*Figures not available.

Railway Construction

BALTIMORE & OHIO.—This company has awarded contracts to the Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa., for the construction of water treating plants at Tontogany, Ohio, Wapakoneta, Ohio, and Twin Creek, Ohio.

CHESAPEAKE & OHIO.—This company has awarded contracts to the Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa., for the construction of water treating plants at Russell, Ky., Huntington, W. Va., Wheeler and Robbins, Ohio, and Whitesville, Taplin and Brushton, W. Va.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the T. S. Leake Construction Company, Chicago, for remodeling the passenger station at Englewood, Chicago.

DENVER & RIO GRANDE WESTERN.—This company has placed an order with the Roberts & Schaefer Company, Chicago, for two standard N. & W. type electric locomotive cinder handling plants for installation at Soldier Summit, Utah.

GREAT NORTHERN.—This company, together with the Northern Pacific and the Chicago, Milwaukee & St. Paul, have agreed to the joint construction by the railroads entering Tacoma, Wash., of a belt line around that city. If the Union Pacific, which is now considering the proposal, approves the action, the construction of the line will be undertaken at once.

GULF, COLORADO & SANTA FE.—The statement that this company reported in the *Railway Age* of November 17, had awarded a contract to W. T. Montgomery, Fort Worth, Tex., for the construction of a spur track from Oak Cliff, Tex., to West Dallas, is incorrect. Plans for the spur track have been considered but the contract has not been let.

ILLINOIS CENTRAL.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of a freight station and a passenger station at Baton Rouge, La., to cost approximately $500,000, as reported in the *Railway Age* of November 3.

ILLINOIS CENTRAL.—This company, jointly with the Pennsylvania, is calling for bids for the construction of a 2-story brick passenger station at Effingham, Ill., to cost approximately $60,000, as reported in the *Railway Age* of September 1.

MICHIGAN CENTRAL.—This company has awarded a contract to the Ellington-Miller Company, Chicago, for the construction of an 8-stall roundhouse, cinder pits, water and sewer lines and a number of small buildings in connection at Lansing, Mich., to cost $125,000.

MISSOURI PACIFIC.—This company plans the construction of a one-story brick passenger station at Newport, Ark., to cost approximately $70,000. This company has awarded a contract to J. J. Wuellner & Son, Alton, Ill., for the construction of a one-story brick passenger station at Bald Knob, Ark., reported in the *Railway Age* of October 20.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—This company is preparing plans for the construction by company forces of a ballast plant at Cumberland, Ala., with a capacity of 500 cu. yd. per day.

OREGON-WASHINGTON RAILROAD & NAVIGATION COMPANY.—This company has applied to the Interstate Commerce Commission for authority for the construction of an extension from Crane to Burns, Ore., 32 miles.

OUTER ISLAND LOGGING ROAD.—A standard gage logging road 12 miles long will be constructed on Outer Island in Lake Superior 40 miles from Ashland, Wis., by the John Schroeder Lumber Company, Ashland, Wis.

ST. LOUIS-SAN FRANCISCO.—This company will close bids December 17 for the construction of a 1-story brick passenger station at Lindenwood, Mo.

ST. LOUIS-SOUTHWESTERN.—This company, jointly with the city of Dallas, Texas, will construct a subway for street traffic at Lemmon avenue in North Dallas at an estimated cost of $75,000.

SODA LAKE.—The Pacific Distributing Corporation, San Francisco, Cal., has awarded a contract to W. C. Burch, San Louis Obispo, Cal., for the construction of a narrow gage railroad, eight miles long, at Soda Lake, Cal.

SOUTHERN PACIFIC OF MEXICO.—This company will construct a bridge over the Culiacan river in Sonora, Mexico, at a cost of $250,000.

SOUTHERN PACIFIC.—This company plans the enlargement of its passenger station at Houston, Tex., at a cost of approximately $25,000.

Courtesy Express Gazette Journal

Woolen Goods Sent by Express—Lawrence, Massachusetts

Railway Financial News

ALABAMA GREAT SOUTHERN.—*Authorized to Nominally Issue Bonds.*—The Interstate Commerce Commission has authorized the authentication and delivery of $500,000 of first consolidated mortgage 5 per cent gold bonds.

BALTIMORE & OHIO.—*Equipment Trusts Sold.*—This company has sold, subject to the approval of the Interstate Commerce Commission, $7,000,000 5 per cent equipment trust certificates, maturing in equal annual instalments from December 1, 1925 to 1938, inclusive, which are being offered by Kuhn, Loeb & Co., Speyer & Co., and the National City Company on a 5.40 per cent basis. The certificates represent 70 per cent of the cost of the following new equipment: 75 freight locomotives; 500 55-ton steel hopper cars; 500 40-ton steel underframe box cars; 1,000 70-ton steel gondola cars.

CHICAGO & ALTON.—*Equipment Trust Certificates Authorized.*—The Interstate Commerce Commission has authorized an issue of $5,400,000 of equipment trust certificates to be sold at 95.

CHICAGO, MILWAUKEE & ST. PAUL.—*New Director.*—E. L. Phillip, president of the Union Refrigerator Transit Company of Milwaukee, and former Governor of Wisconsin, has been elected a director to succeed A. J. Earling.

CHICAGO & NORTH WESTERN.—*Asks Authority for Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $7,740,000 of 5 per cent equipment trust certificates to be sold at par, or at 97½. The company will invite bids.

CHICAGO, PEORIA & ST. LOUIS.—*Sale Postponed.*—The sale of this road has been postponed from November 8 until December 15.

CHICAGO, TERRE HAUTE & SOUTHEASTERN.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of $1,969,533 of first and refunding mortgage 5 per cent bonds to be guaranteed by the Chicago, Milwaukee & St. Paul.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $20,000,000 of refunding and improvement mortgage bonds at 5 or 5½ per cent, the proceeds to be used to retire existing indebtedness. The company is in negotiation with Morgan & Co., and expects to sell the bonds on a basis of 5.9 per cent.

A special meeting of stockholders has been called for December 22 to authorize the issuance of $10,000,000 under the refunding and improvement mortgage, in addition to the $25,000,000 authorized in the mortgage for other than refunding purposes. This $10,000,000 of the bonds may then be added to other bonds available under the same mortgage. A majority vote of the preferred stockholders is required to authorize the additional issue.

HIGH POINT, THOMASVILLE & DENTON.—*Asks Authority to Acquire Line.*—This company has applied to the Interstate Commerce Commission for a certificate authorizing the acquisition and operation of the Carolina & Yadkin River.

LEHIGH VALLEY.—*To Pay Off Bonds.*—President E. E. Loomis has announced that the company will pay off the $5,530,000 consolidated mortgage 6 per cent and the $4,696,000 consolidated mortgage 4½ per cent bonds due December 1 from cash in hand.

MONONGAHELA.—*Asks Authority to Acquire Control.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Scotts Run and the Monongahela & Ohio and the Scotts Run has applied for authority to issue $1,000,000 of common stock to be issued in payment for the property of the Morgantown & Wheeling.

SEABOARD AIR LINE.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority for the authentication and delivery of $1,693,000 of first and consolidated mortgage 6 per cent gold bonds to be pledged as collateral for a government loan of $1,258,000.

SOUTHERN PACIFIC.—*Asks Authority to Lease Lines.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Arizona Eastern and the Phoenix & Eastern by lease until June 30, 1951. It already owns most of the outstanding stock of the two companies.

ST. PAUL UNION DEPOT COMPANY.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of $15,000,000 of first and refunding mortgage bonds to be sold at not less than 91½.

TEXAS & PACIFIC.—*Reorganization Plan.*—Details of the plan of reorganization of this company, which has been in receivership since October 27, 1916, were made public by Kuhn, Loeb & Co. on Monday. The plan contemplates readjustment without foreclosure or sale, so the company will be able to retain its federal charter; and $3,000,000 in cash is provided through funding of additions and betterments made during federal control. No assessment of stockholders is contemplated.

The directors of the Texas & Pacific, and the common stockholders' committee, which includes William Church Osborn, Dunlevy Milbank, Alvin W. Krech and Albert A. Jackson have assented to the plan. The Missouri Pacific, which owns $23,703,000 of the outstanding $24,676,000 second mortgage income bonds and $10,000,000 of the outstanding $38,755,110 common stock, has also assented to the plan. The Missouri Pacific will receive new preferred stock in exchange for the bonds.

The main features of the plan are:

Common stock of the Texas & Pacific is to remain undisturbed and no assessment is to be imposed upon it.

Second mortgage income bonds, of which $24,676,000 are outstanding, are to be exchanged for 5 per cent non-cumulative preferred stock, par for par.

A new general and refunding mortgage bond is to be issued to provide for refunding the underlying bonds and for future extensions, betterments and improvements.

Outstanding judgments, aggregating $4,440,000, to be refunded into unsecured coupon serial notes bearing 6 per cent interest and maturing in annual instalments over a period of ten years, beginning January 1, 1930.

Cash totaling $3,000,000 plus $1,400,000 due the government as the result of improvement during federal control, is to be provided by the issuance of $4,400,000 in notes maturing March 1, 1930, and secured by pledge of general and refunding mortgage bonds.

A letter from the receivers of the Texas & Pacific to the reorganization managers, attached to the plan, states that $21,209,684 was expended for additions and betterments to the property during the receivership, of which $15,290,129 was expended out of earnings, all debts of the company prior to receivership, other than judgments which will be funded under the plan, have been paid, and that it is expected there will be available to be turned over to the company upon consummation of the plan, at least $1,500,000 in cash, which, together with the $3,000,000 to be obtained from the director general, will be sufficient for the expenses of readjustment, for working capital and for all capital expenses during the year 1924.

According to the receivers' estimate, net income available for interest will be not less than $4,500,000 for 1923, and will be $5,600,000 for 1924, $6,300,000 for 1925, and $6,700,000 for 1926. If all security holders accept the plan, annual fixed charges after its consummation will be $2,268,510 and annual dividend requirements on new preferred stock will be $1,233,800, a total of $3,502,310.

Holders of income bonds who desire to participate in the reorganization may deposit their bonds with the readjustment managers.

A Special meeting of the stockholders of the Texas & Pacific has been called for December 21, at the office of the company, 120 Broadway, New York, to authorize the necessary corporate action to carry out the plan. The common stockholders' committee above-mentioned will act as a proxy committee at this meeting.

Dividends Declared

Chesapeake & Ohio.—Common, 2 per cent, semi-annually; cumulative preferred, 3¼ per cent, semi-annually; both payable January 1 to holders of record December 7.

Chicago, Rock Island & Pacific.—6 per cent preferred, $3, semi-annually; 7 per cent preferred, $3.50, semi-annually; both payable December 31 to holders of record December 7.

Hocking Valley.—Common, 2 per cent, semi-annually, payable January 1 to holders of record December 7.

Mobile & Birmingham.—Preferred, 2 per cent, payable January 2.

Pittsburgh, Youngstown & Ashtabula.—Preferred, 1¾ per cent, quarterly, payable December 1 to holders of record November 20.

Trend of Railway Stock and Bond Prices

	Nov. 27	Last Week	Last Year
Average price of 20 representative railway stocks	61.72	60.99	64.53
Average price of 20 representative railway bonds	82.43	82.42	81.94

Railway Officers

Operating

E. I. Ford, general agent of the operating department of the Chesapeake & Ohio, has been appointed assistant general superintendent with headquarters at Huntington, W. Va.

H. A. Wicke has been appointed superintendent of the claim prevention bureau of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, a newly created position.

O. M. Stevens has been appointed acting superintendent of the Iowa division of the Chicago, Milwaukee & St. Paul, with headquarters at Marion, Iowa, succeeding **C. H. Marshall,** who has been granted leave of absence on account of illness.

Edward B. Whitman, whose appointment as superintendent of the Pennsylvania, with headquarters at Buffalo, N. Y., was announced in the *Railway Age* of October 27, page 794, was born on November 6, 1888, at Washington, D. C., and attended St. Paul's School, Concord, N. H., and was graduated from Princeton University in 1910. He entered railway service on June 21 of the same year as a special apprentice at the Altoona shops of the Pennsylvania. In 1915 he was appointed motive power inspector and a year later was appointed assistant road foreman of engines. In 1917 he entered the army and served as a major and a commanding officer of the Fifty-ninth railway engineers of the American Expeditionary Force. Returning from military service, in 1919, he was appointed assistant master mechanic in the office of assistant to the general manager and then as master mechanic of the Wilmington shops, which position he was holding at the time of his recent promotion to division superintendent.

E. B. Whitman

M. Lowman has been appointed freight trainmaster of the Middle division of the Pennsylvania. **G. B. Elmhirst** has been appointed trainmaster of the Trenton division. **C. O. Long** has been appointed assistant freight trainmaster of the New York division. **J. G. Sheaffer** has been appointed assistant superintendent of the Philadelphia division.

Traffic

C. L. Hinnant has been appointed assistant general freight agent of the Atlantic Coast Line with headquarters at Wilmington, N. C.

J. F. Bon has been appointed assistant general freight agent of the Western Pacific, with headquarters at San Francisco, Cal., succeeding Theodore Harte, who has resigned.

J. Noble Snider, coal traffic manager of the New York Central, has resigned to become vice-president in charge of sales of the Rochester & Pittsburgh Coal & Iron Company with headquarters at 1 Broadway, New York.

Capt. Charles E. McCullough has been appointed division passenger agent of the Pennsylvania, with headquarters in New York, succeeding **William Pedrick, Jr. Ira B. Yeakle,** heretofore district passenger representative at Baltimore, Md., has become division passenger agent at that city succeeding Captain McCullough. At Washington, **Thomas L. Lipsett,** who has heretofore been district passenger representative, has been advanced to the rank of division passenger agent.

A. H. Stevens, general agent for the St. Louis-San Francisco, with headquarters at Denver, Colo., has been transferred to San Francisco, succeeding C. A. Forrest, whose promotion to executive general agent with headquarters at Birmingham, Ala., was reported in the *Railway Age* of November 10, page 891. **W. L. Evans,** district passenger agent, with headquarters at San Francisco, has been promoted to general agent, with headquarters at Denver, succeeding **Mr.** Stevens.

H. G. Holden, general freight agent of the Wabash, with headquarters at St. Louis, Mo., has been promoted to assistant freight traffic manager, with the same headquarters, a newly created position. **E. R. Newman,** assistant general freight agent, with headquarters at Chicago, has been promoted to assistant freight traffic manager, with the same headquarters, also a newly created position. **G. G. Early,** assistant general freight agent, with headquarters at St. Louis, has been promoted to general freight agent, with the same headquarters, succeeding Mr. Holden. **F. A. Barber,** chief of the tariff bureau at St. Louis, has been promoted to assistant general freight agent, with the same headquarters, succeeding Mr. Early. **W. E. Mattox,** assistant chief of the tariff bureau at St. Louis, has been promoted to chief of the tariff bureau, with the same headquarters, succeeding Mr. Barber.

J. A. Fitzpatrick, whose appointment as assistant to the traffic manager of the New York, Chicago & St. Louis with headquarters at Cleveland, Ohio, was reported in the *Railway Age* of October 27, entered railway service in 1894 as a telegraph operator and local agent on the Wabash. In 1905, he was appointed city passenger agent for the Toledo, St. Louis & Western at St. Louis, Mo., being subsequently promoted to traveling freight agent at St. Louis. He was promoted consecutively to commercial agent at Dallas, Tex., general agent at Buffalo, N. Y., and Pacific coast agent, with headquarters at Los Angeles, Cal. Mr. Fitzpatrick was later transferred to Pittsburgh, Pa., as general agent and held this position until his promotion to assistant general freight agent, with headquarters at Toledo, Ohio. He was subsequently promoted to assistant freight traffic manager, with headquarters at Toledo, which position he held until his recent appointment as assistant to the traffic manager of the New York, Chicago & St. Louis.

E. R. Oliver, whose appointment as freight traffic manager of the Southern with headquarters at Washington, D. C., was announced in the *Railway Age* of October 20, page 749, was born on February 25, 1883, at Taylor's, Miss., and was educated at Jefferson Law School. He entered railway service in 1898 and held various positions in local agencies for the Southern until 1906 when he was appointed traveling freight agent at Chicago. A year later he went to Louisville, Ky., as soliciting freight agent and in 1910 was appointed chief clerk to the assistant freight traffic manager. Two years later he was promoted to assistant general freight agent at Louisville and in 1916 was transferred in a similar capacity to Washington, D. C. A few years later he was transferred to Atlanta, Ga., and in 1920 was promoted to general freight agent at Cincinnati, Ohio. A short time thereafter he became freight traffic manager, lines west, with the same headquarters, and a year later was appointed executive general agent at New Orleans, La., which position he held up to the time of his recent promotion.

Mechanical

Frank Roehr has been appointed master car repairer of the San Joaquin division of the Southern Pacific, with headquarters at Bakersfield, Cal., succeeding **M. H. Warren,** who has retired.

J. L. Smith has been appointed superintendent of motive power of the Pittsburgh & West Virginia and the West Side Belt with headquarters at Pittsburgh, Pa., succeeding **H. P.** Anderson, resigned.

R. A. Greene, supervisor of fuel and lubrication of the Chicago & Alton, with headquarters at Bloomington, Ill., has resigned to enter the service of the Galena Signal Oil Company as a special representative at Chicago.

H. M. Curry, general mechanical superintendent of the Northern Pacific, with headquarters at St. Paul, Minn., has retired from active duty after 43 years of continuous service with the company. Mr. Curry was born on January 6, 1861, in Ogle county, Ill., and entered railway service in April, 1880, as a shop man and locomotive fireman on the Northern Pacific, being promoted to locomotive engineer in July, 1882. He was promoted to assistant road foreman of engines of the lines east of the Missouri river on December 1, 1891, and in December, 1898, was promoted to road foreman of engines. Mr. Curry was promoted to division master mechanic at Fargo, N. D., in November, 1901, and was transferred to Staples, Minn., in December of the following year. He was promoted to general master mechanic of the lines east of Billings, Mont., in February, 1905, and in January, 1908, was given extended duties as general master mechanic to include the lines east of Paradise, Mont. In January, 1910, he was appointed general master mechanic of the lines east of the Missouri river. Mr. Curry was promoted to mechanical superintendent in May, 1911, and in August, 1920, was promoted to general mechanical superintendent.

H. M. Curry

F. P. Howell, whose appointment as superintendent of motive power of the Atlantic Coast Line, with headquarters at Waycross, Ga., was announced in the *Railway Age* of November 10, page 892, was born on October 11, 1876, at Tarboro, N. C. He entered railway service on April 11, 1896, as a machinist's apprentice on the Atlantic Coast Line. In April, 1902, he was appointed night roundhouse foreman at Rocky Mount, N. C., and in May, 1903, was promoted to gang foreman, holding that position until March, 1908, when he was appointed erecting shop foreman, with the same headquarters. In January, 1909, he was transferred to the Waycross shops in the same capacity and in July, 1917, was promoted to general foreman with the same headquarters. A year later he was transferred to Savannah, Ga., as master mechanic of the Savannah and Charleston districts, serving in that capacity until October 15, 1920, when he was appointed shop superintendent at Waycross, which position he was holding at the time of his recent promotion to superintendent of motive power of the Second and Third divisions.

F. P. Howell

C. K. Vaught has been appointed assistant master mechanic of the Middle division of the Pennsylvania, succeeding J. G. Shaeffer, promoted. **H. H. Haupt** has been appointed master mechanic at Wilmington, Del., succeeding E. B. Whitman, promoted. **W. B. Porter** has been appointed assistant engineer of motive power in the office of the general superintendent of motive power of the Eastern region, succeeding Mr. Haupt. **G. S. West** has been appointed to a similar position on the Central Pennsylvania division, succeeding Mr. Porter. **D. K. Chase** has been appointed assistant master mechanic of the Meadows shops, succeeding Mr. West. **C. A. Wilson** has been appointed assistant master mechanic of the Trenton division, succeeding **E. R. Buck,** who has been transferred to a similar position on the Atlantic division.

Silas Zwight, acting general mechanical superintendent of the Northern Pacific, with headquarters at St. Paul, Minn., has been promoted to general mechanical superintendent, with the same headquarters, succeeding H. M. Curry, who has retired. **E. L. Grimm,** mechanical engineer, with headquarters at St. Paul, has been promoted to assistant to the general mechanical superintendent, with the same headquarters, a newly created position. **T. J. Cutler,** acting mechanical superintendent, with headquarters at St. Paul, has been promoted to mechanical superintendent of the lines east of Paradise, Mont., with the same headquarters. **G. F. Endicott,** assistant master car builder, with headquarters at St. Paul, has been promoted to mechanical engineer, with the same headquarters, succeeding Mr. Grimm. **B. P. Johnson,** acting general master mechanic of the lines from Mandan, Mont., to Paradise, with headquarters at Livingston, Mont., has been promoted to general master mechanic, with the same headquarters. **James Matheson,** acting master mechanic of the Seattle division, with headquarters at Seattle, Wash., has been promoted to master mechanic, with the same headquarters.

Engineering, Maintenance of Way and Signaling

R. C. Miller has been appointed division engineer of the New York division of the Pennsylvania, succeeding N. B. Pitcairn, promoted. **J. H. Cooper** has been appointed to a similar position on the Philadelphia division.

C. D. Johnson has been appointed division engineer of the Alamosa division of the Denver & Rio Grande Western, with headquarters at Alamosa, Colo. **G. Darby** has been appointed division engineer of the Gunnison division, with headquarters at Gunnison, Colo.

The Chesapeake & Ohio has appointed the following assistant division engineers: **R. L. Kittredge,** Richmond division, headquarters, Richmond, Va.; **M. I. Dunn, Jr.,** Clifton Forge division, headquarters, Clifton Forge, Va.; **W. H. Hanchett,** Hinton division, headquarters, Hinton, W. Va.; **H. M. Church,** Huntington division, headquarters, Huntington, W. Va.; **G. J. Johnson,** Ashland-Big Sandy division, headquarters, Ashland, Ky.; **H. L. McCutcheon,** Cincinnati-Northern division, headquarters, Covington, Ky.; **E. E. Phillips,** Chicago division, headquarters, Peru, Ind.

W. H. Hulsizer, whose promotion to valuation engineer of the Union Pacific, with headquarters at Omaha, Neb., was reported in the *Railway Age* of November 10, was born on September 25, 1885, at Flemington, N. J. He graduated from the engineering school of Princeton University in 1907 and was engaged the following year in the design and construction of concrete and steel mill buildings and the next year on plane table surveys in Canadian timber land. He entered railway service in June, 1909, on location surveys for the Southern Pacific in New Mexico. In June, 1910, he entered the valuation department of the Union Pacific as a special clerk on land and appraisal work. He was later promoted to office assistant and to assistant engineer and subsequently to assistant to the valuation officer, which position he held until his recent promotion to valuation engineer, a newly created office.

Obituary

J. F. Richards, superintendent of the employment bureau of the Chicago, Milwaukee & St. Paul, Western lines, with headquarters at Seattle, Wash., died in that city on November 25.